School Shop

FOR INDUSTRIAL ARTS & VOCATIONAL EDUCATION TEACHERS

vol. V no. 2

October, 1945

Teaching Mass-Production Technics
by George P. Busca

Films for Shop Training—Part II
by Floyde E. Brooker

Graduated Square
by J. Kenneth Hill

Modern Lamp
by Rufus Jacoby

On the cover: Students in the industrial-arts department of the Thomas Jefferson High School, Elizabeth, N. J., studying the use of measuring and gaging instruments.

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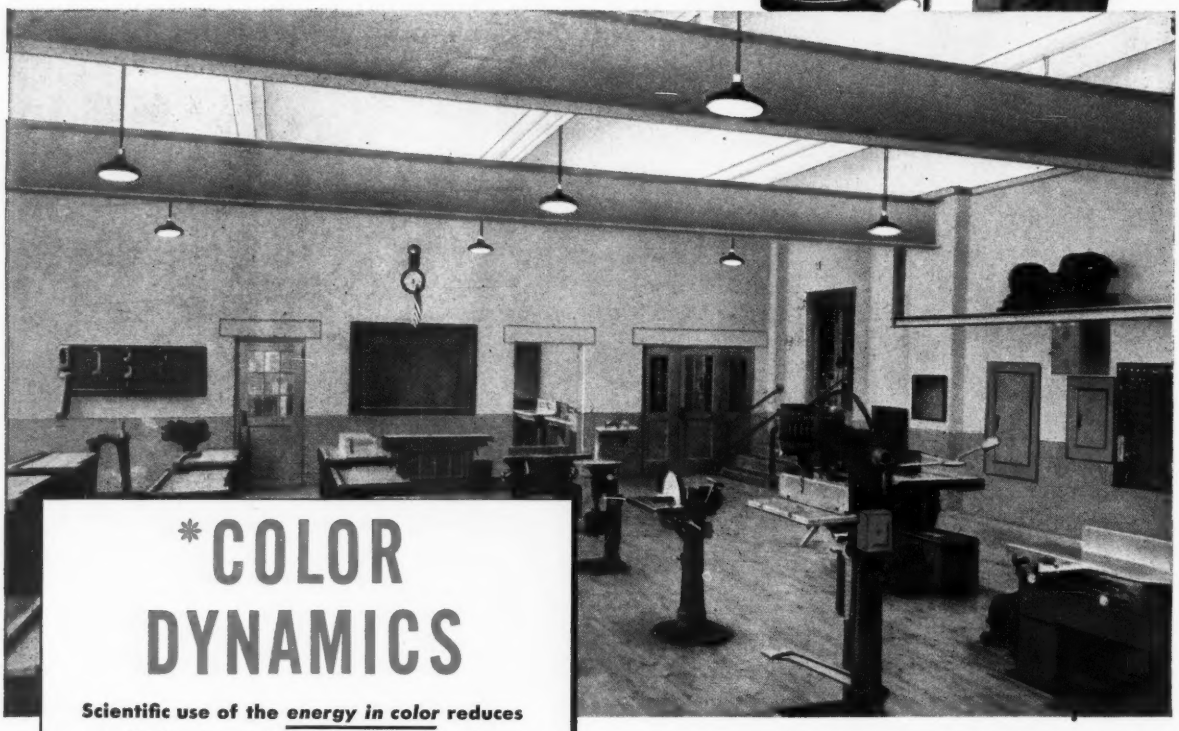

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Next month SCHOOL SHOP will bring you a description of a course in plastics offered in a vocational high school, a textile course for industrial-arts departments, and the last installment of the series on the use of films. In addition other helpful articles and regular features such as School Shop Kinks, Instructional Resources, and News from Industry will give you ideas for your teaching program.

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School Shop

FOR INDUSTRIAL EDUCATION TEACHERS

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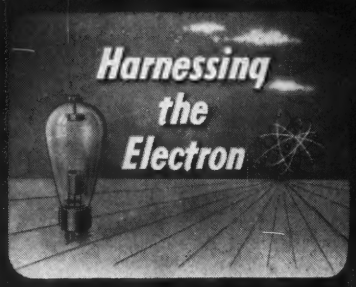

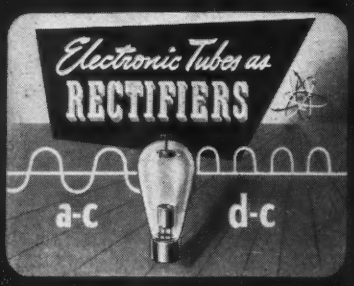

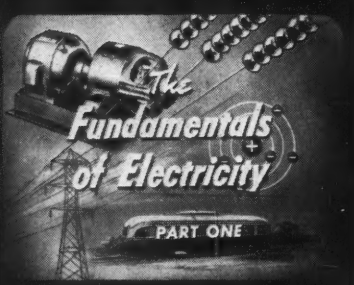

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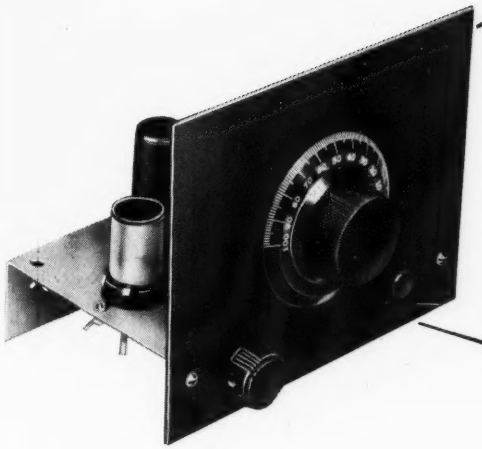

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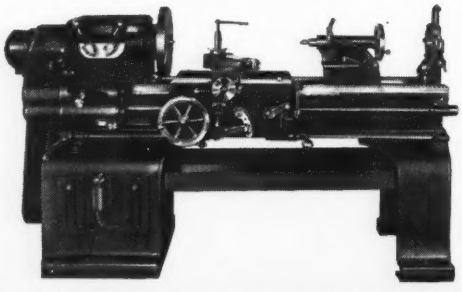

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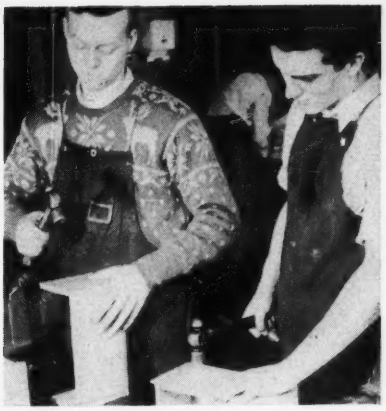
1. Cutting to size.



2. Assembling boxes.

3. Inspection.

Teaching Mass-Production Technics

BY *George P. Busca*

A mass-production program can be full of pitfalls from an instructional standpoint. Here is one that has many educational advantages and contributes to a most worthy cause. George P. Busca teaches in the Hirsch High School, Chicago, Illinois.

WHEN the Junior Red Cross asked the Hirsch High School shop classes to construct 250 ping-pong tables and 850 game kits containing 7650 assorted games, we welcomed the opportunity to conduct an experiment in teaching mass-production technics. As well as helping the Red Cross, then, our students would be gaining valuable experience in industrial processes.

Planning the Program

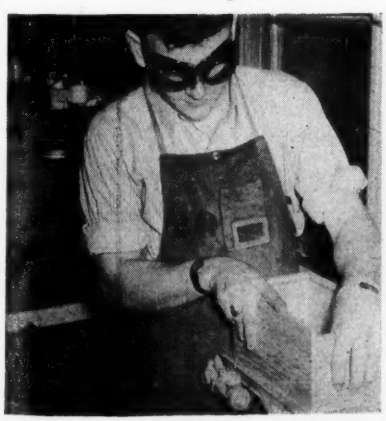
Local manufacturers were glad to help us in setting up the program and in securing equipment and raw materials. Shop students were briefed as to manufacturing procedures. It was decided, after discussion, to set up shifts of ten persons each to work five weeks on the project, rotating their jobs weekly in order to give each student an opportunity to cover all of the operations involved. Students not working on the project continued with their regular shopwork until their shift was ready to begin work. We encouraged students to use their ingenuity in devising new methods of stepping up production.

Because we wanted to simulate actual manufacturing conditions as much as possible, the shop was set up like a miniature factory. Students of advanced shop were made responsible for the tooling-up process; metalworking students made the jigs and dies for punching out the holes in the games; and woodworking students devised and set up the jigs for cutting and assembling the game-kit boxes. Setting up and printing the instructions for the games was the contribution of the printing department, while students in planning laid out the various game designs engraved on rubber printing plates. It fell to the lot of still another group to arrange to have a continuous line of precut material flow through the assembly lines. This accomplished, the groups were then ready to begin production operations.

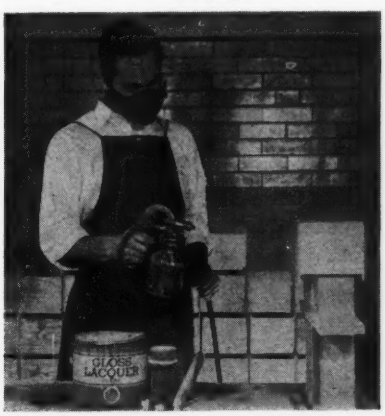
Constructing the Games

Our photography department took the set of 12 pictures which shows the continuity of our production operations from the time we commence with the raw material until the finished games are packed for transportation to the hospital ships. By starting on one operation and rotating his activity every week, each student covers all the operating steps and thus gains a clear picture of

4. Sanding.

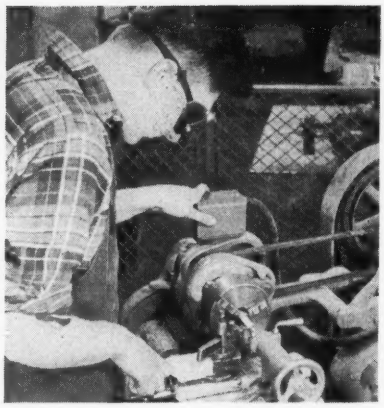


5. Spraying.

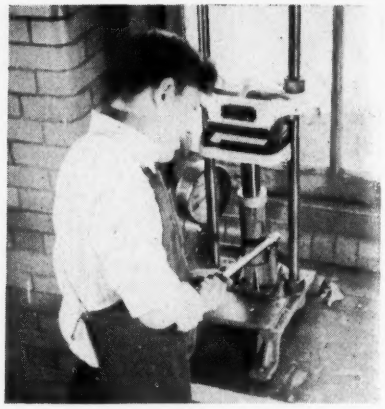


6. Installing handles.

7. Drilling finger grip in tops.



8. Turning punches on metal lathe.



9. Punching holes on hydraulic press.

mass-production technics and planning.

Evaluating the Program

Although many of our students work in war-production plants, their activity is, for the most part, confined to a single operation, which enables them to gain little conception of industrial production methods as a whole. Work on a mass-production experiment, however, gives them some idea of the wide range of vocational opportunities which will be available to them in postwar industrial fields. Knowing the potentialities of industrial manufacturing methods in the United States will, we feel, enable the students to make better vocational choices. Of course, we do not want to train our students for specific jobs in factories.

"Youth needs a preview of the modern business world as it is today," plus a knowledge of how each department of any business operates. We don't intend that all of our students should become factory workers; some of them, through additional training and because of unusual ability, will advance to better and more remunerative positions. Experience such as that afforded by our mass-production experiment cannot help but contribute toward that understanding of the labor conditions in his own field which is prerequisite to a good executive.

Training in mass-production technics, too, helps to give students an appreciation of good workmanship and of the necessity for precision. If a student who cuts raw material to size on the circular saw one day is put on the assembly line the next, he realizes that unless raw material is cut accurately it is wasted.

An understanding of the need for cooperation and teamwork is another outcome of the group project. The students learn that both foremen and workers are responsible for the success of any project and that teamwork, fair play, and dependability are necessary adjuncts of any undertaking.

Through theoretical earnings and through purchase of raw materials for such a project, students are taught the value of time and materials. The experience will stand them in good stead in their future vocations.

Participation in a mass-production experiment enables the boys to learn the principles of, and develop an appreciation for, good design. After the first run of boxes for our project had been made, our students had so many good suggestions to offer that the Junior Red Cross accepted our new design as standard for the game kits.

Furthermore, principles of accurate workmanship impress themselves on the boys because they know they must maintain high standards of workmanship in order to pass the student inspector, and, in the case of our project, to live up to the Junior Red Cross slogan: "Those in the armed forces are doing their best . . . give them your best."

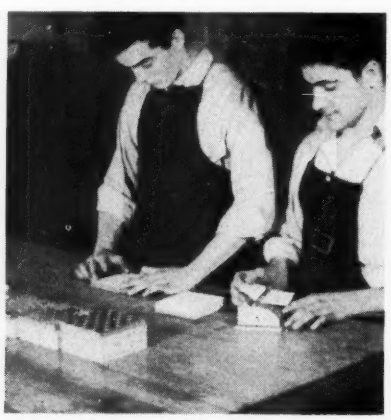
Students are encouraged to devise new technics of manufacturing and to improve on business methods. As concrete evidence of the selfreliance of the participants in our project and of their contributions, I cite the following:

A student who sprayed games had to rebuild the spray gun completely and overhaul and

(Continued on page 13)

10. Printing outline on games.

11. Labeling game instructions.



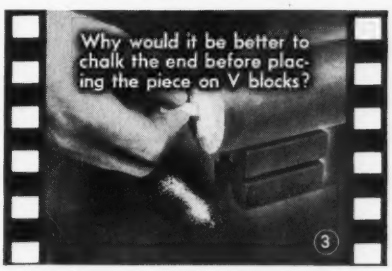
12. Packing completed games for shipment.

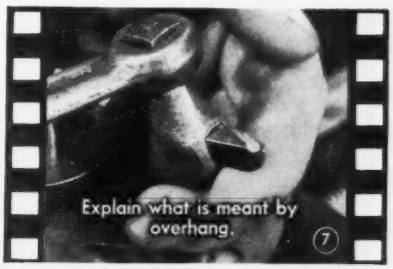
Films for Shop Training

Part II—Forewarned Is Forearmed

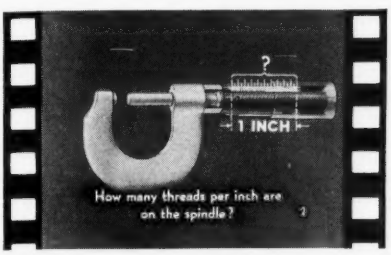
BY *Floyde E. Brooker*

Slides from the film-strip series produced by the U. S. Office of Education.





Floyde E. Brooker, Director, Visual Aids for War Training, U. S. Office of Education, continues here the discussion of the use of films for shop training which began in the September issue of SCHOOL SHOP. Next month the concluding installment, "This Is How It's Done," will give the shop teacher specific technics for film use.



NO person can train himself effectively unless he has some idea of the exact problem his training is supposed to help him solve. Around 1908, the man who bought a car after having used a horse all his life wouldn't have made much progress in learning to drive if he'd thought the car was just another kind of horse. The first step in learning to use visual aids, too, is the recognition that an entirely different set of operating principles is involved. An understanding of the problems listed below will help the would-be user of visual aids to avoid disappointment and failure.

1. "Hang-over"

Training films all too often suffer from the "hang-over" of the theatrical tradition. All of us enjoy the entertainment films we see at the local theaters, so what could be more logical than to invite everyone to see and enjoy the new training film we've just received. Certainly it's logical enough, but it just won't work! If someone showed you a new machine-shop textbook, though, you wouldn't pass it around indiscriminately among your friends, would you? You'd read it yourself first, and then you might call it to the attention of other machine-shop instructors. Training films should be handled in much the same way. It probably does little harm to invite the woodworking department over to see a movie on storage batteries, for instance, but such use dissipates the natural interest that people have in things which move and fritters it away in fun instead of putting it to work. Films may at first excite interest as being a novelty, but no sound educational program can be based on a novelty.

2. Something New Has Been Added

Training films cannot be just something new added to a course. For some time the teacher has taught shopwork by the traditional methods of demonstrations, classes in related information, lectures, tests, drills, etc., and when films come along he will probably try to crowd a film showing into his already full schedule. Under such conditions, a teacher may quite rightfully say, "I have so much to teach and so much to do that I can't take the time to show any films."

But films will never render maximum assistance to instructors who use them in such a manner. If an automatic machine is added to a production line wholly dependent on lathes, the job of most of the lathes is likely to change. Some of the lathes will most certainly no longer be needed, and even the design of the piece may be changed. So it is with films. Films, at least most of those produced by the U. S. Office of Education, provide a demonstration accompanied by a commentary that explains the operations and presents much of the material given in the related information class. This does not mean, however, that either the demonstrations or the related information class will be eliminated; it means simply that the films will take over some of the work formerly done by these activities and that both will have to be adjusted in terms of the instructional load the film will carry.

What proportion of the instructional load films may be expected to take over will have to be determined by the individual instructor. Frankly, films in training are so new that very little at present is known about this. The armed forces naturally have had the greatest experience along this line, but theirs is a highly specialized experience that will not permit broad generalizations that may be applied to school and industrial shop training.

Nor do we know just how the use of films is likely to change the nature and the job of the instructor demonstration. We can, however, on the basis of what we know, make some suggestions which will be incorporated in the next section. In this connection, too, the instructor will do his best job if he does some experimentation in his own use of films.

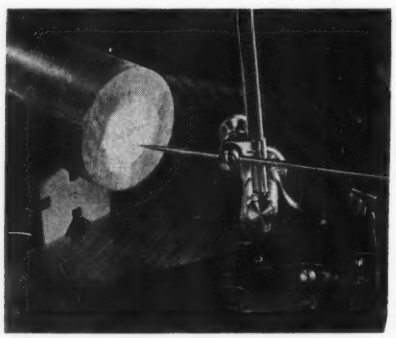
3. "Reading" Pictures

Training films depend largely on pictures to carry their message, and we have not yet learned how to get the message out of pictures—in short, we do not know how to "read" pictures. We are accustomed to pictures largely as "designs" used to break the monotony of a bare wall or of the printed page. Another common use of pictures is to "illustrate" verbal content matter, but in this connection, too, the idea is carried by the words.

The problem is quite different when the picture itself must convey the idea. Things in the picture are included only because they have significance, and we must learn to look for that meaning. If as an adult you look at a hickory tree and its surroundings, for example, and ask yourself such questions as whether the tree was planted there purposely or by chance, whether or not it is indigenous to the region, whether it enhances the beauty of the region as well as any other tree could possibly do it, or

whether the soil in which it's growing is rich or poor, then you have a good basis for reading a picture.

Acquiring the habit of looking at pictures this way will take some practice, but it is the only way of showing pictures as an instructional device. The instructor should learn to recognize pictures that are rich with meaning, and should be able to determine whether they are elementary or advanced and whether they will fit into the work of his class. Judging from all ordinary standards the accompanying illustration is a "nice" picture—it has sharp, clear definition, good composition, and "interesting" subject matter. It would require more careful study and scrutiny, with



"Reading" this picture requires skill. See accompanying text.

some background in the subject matter, to answer such questions as:

What are the tolerances allowable on this sort of job?

What in the picture indicates this tolerance?

What determines the range of tolerance?

The quality of a picture for educational purposes is proportionate to the richness of material it provides for such "reading."

Now this is quite different from the usual approach to pictures. It is, nevertheless, basic to all visual forms of communication; and until the instructor understands this principle, he will not get the maximum assistance from his visual aids.

Once the teacher has mastered the method of reading pictures, he then has the rather difficult job of learning the chief differences between communication via words and communication via pictures. Although these differences cannot be discussed in complete detail here, they can be given sufficient attention to permit the alert instructor to understand the problem and then, through his own experimentation, to work out the solution.

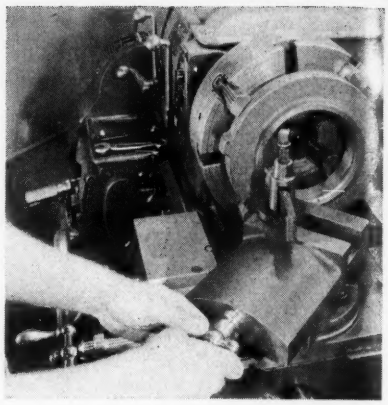
a) Pictures are much more specific than words. This is one of the great strengths of pictures. A picture can show so clearly a roughing tool in proper shape, with all the angles properly ground and set to the correct point to take a cut on a forging, that students who see and understand it will recognize when they have achieved an equally good setup in their own work.

But this same specificity is also one of the greatest weaknesses of pictures. Films showing a lathe, for example, must stick to one make, one vintage, and one model of lathe. On other types of lathes the various controls may be differently placed; hence the instructor must point out to the student that these superficial differences do not alter the basic principles of operation. Since shop training would be in a sorry fix if a student learned on an XYZ lathe and then failed in industry because he was given an ABC lathe to operate, it is important that such differences be pointed out to every shop student at some time in his training.

b) Pictures present simultaneously the material for many ideas. Words cannot do this. The picture of a good lathe setup for a roughing cut, for instance, will show a short overhang, a chip-breaker groove, the angle of a tool holder, the clearance and rake angles of the cutting tool, the placement of the cutting edge in relation to the center line —all at the same time. The machinist sees all these things at a glance. To explain all these circumstances in words, however, is to present a false picture, because one situation must be placed before another, giving a false sense of sequence.

What the teacher gets out of the picture will depend on his own background and his particular purpose at that time. He may want to use the picture as the basis of a class discussion of the principle of overhang or of cutting-edge angles, or he may want to quiz the students on the points in the picture which go to make it a good setup.

c) No presentation, whether it be words or pictures, can be complete. Although we ordinarily do not expect words to cover every aspect of a situation, some shop teachers believe that pictures should do so. For example, teachers have been known to complain because a film on the use of the lathe did not explain the use of the micrometer when one was introduced in measuring a cut or because there was no discussion of the differences between red and white lead in the tail center hole. The fact that



Cutting angle with the compound rest. Scene from U. S. Office of Education visual-aids unit No. 57, "Cutting an Internal Taper Pipe Thread."

an individual instructor may disagree with the judgment of the producers, however, should not nullify the assistance the motion picture can render. It is for this reason that sometimes a series of films has been produced to cover some subjects.

d) Maturational levels of pictures are not yet fully understood. We understand these levels of difficulty fairly well in terms of words, but we do not have sufficient experience in the use of pictures. Learning through films involves different principles than learning through traditional methods. Each instructor who uses films is invited to check his own experience on this point.

4. The Omnibus Problem

The fourth problem, which includes all the other three, follows naturally from them: Training films are being used with relatively crude equipment in traditional school buildings under traditional school administration in traditional courses of study by instructors who find films new and strange.

a) Manufacturers have done wonders during the past few years in producing projectors which work well with proper care and with a fairly skilled operator, but the machine still intimidates all but the most mechanical minded. Not so long ago I visited one of the foremost vocational schools in America where they had a good 16mm projector that was operated *only* by one of their most competent machinist instructors! All around were machine tools which cost two to ten times as much as the projector —students were free to use them, whereas the projector could be used only when one particular instructor had time available. Granted that bulbs do burn out and shutters stick, that an expensive film can be wrecked without the person

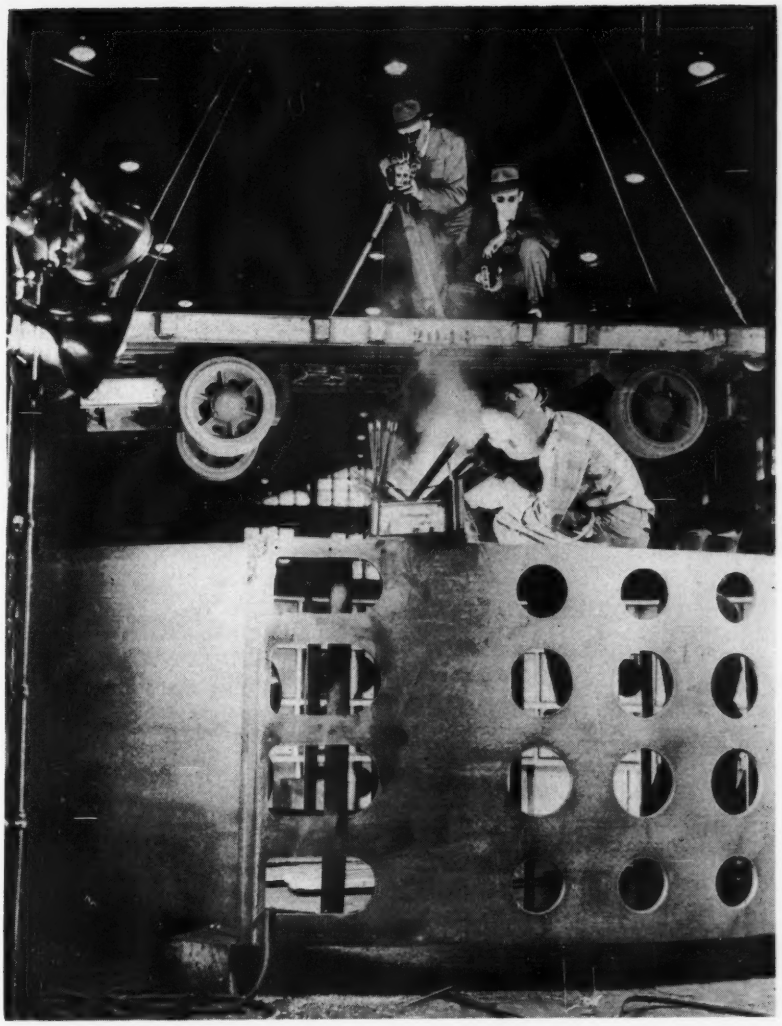
showing the film realizing that it is being ruined; nevertheless, the average shop student can learn to operate a projector well within a very short time.

b) Most buildings in use today were not designed for the use of films. It is hard to darken the rooms adequately; electric outlets are not conveniently located; ventilation in the darkened rooms is generally poor; and in the vast majority of cases the whole setup is a makeshift one.

c) The average school administration understands neither the requirements of films nor the benefits to be derived from the use of them. The school administrator may be sympathetic toward the use of films, but too often he does not understand the responsibility entailed in the efficient and economical use of films—the arrangements for film storage, cataloguing, distribution, etc. Not realizing that film costs per student compare favorably with the cost of textbooks, he is frightened by film cost. If the average school were to allocate to films for one year one-fourth of the per capita cost allowed generally for textual materials, an abundant film program could be developed through the cumulative purchase and rental of desired films.

d) In traditional courses of study, given time per student has been allotted for the purpose of covering the course content in terms of existing tools and methods of instruction. All the available time is taken up by classwork. Time given to the use of films must be taken away from one of the traditional activities. No one is sure at this stage from what this time can best be spared.

e) To the average instructor the use of films is both new and strange. Unfortunately, organized vocational education has assumed no leadership in improving this situation. Instructors who honestly try to use films as instructional tools, rather than as omnibus "shows" for the sake of entertainment, are a lonely few. Most instructors, however, do not feel "at home" with the medium—actually the students are more experienced than they in terms of motion-picture technics. But they have a feeling films are good and the response of the students to them is such that after a few trials they are convinced. How should the motion pictures be used, though? That leads us into the next article in the series, "This Is How It's Done," which will appear next month.



Shooting "The Inside of Arc Welding," an educational 16mm technicolor sound film produced by the General Electric Co.

Now That Peace Has Come—*An Editorial*

WITH the sound of shooting still fresh in our ears it is difficult to consider the war in retrospect. It remains too fundamentally a part of us. Some ideas permeate our thinking as citizens and as teachers, nevertheless.

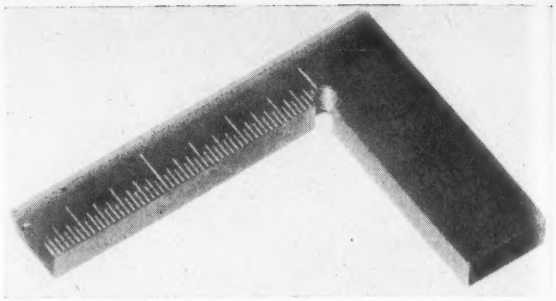
One is firm conviction that it shall never happen again. Whether the subjects we teach fall in the realm of the social studies or not, students are affected by our statements and attitudes on how the peace may be maintained. As instructors of the young and as citizens in a democracy, we can help prevent future holocausts by teaching and practicing respect for the innate dignity and rights of the individual and furthering the opportunity for all peoples to seek these ends. Some of the mechanics for achieving these objectives are in the making. Foremost is the United Nations Charter. Peace treaties are being formulated at this moment. Shop teachers and students are also citizens. These documents demand our attention.

Many school shops have been geared to a wartime program. Thoughtful reconversion is as important in industrial education as it is in industrial production. Our responsibility is primarily to the young people of the Nation. Decisions regarding changes in curricular offerings, course content, teaching methods should be made with this responsibility in mind. An intelligent program on such a foundation will never have to be defended.

Thoughtfulness is a requisite for lasting peace and the abundant life for all.

Graduated Square

BY *J. Kenneth Hill*



Elementary machine-shop students quickly come to understand the importance of mathematics when making this project. J. Kenneth Hill teaches in the Union-Endicott High School, Endicott, New York.

TESTED INSTRUCTIONAL PROJECT

THIS project has been designed to aid students in learning the application of mathematics to shop problems. In this particular instance, the use of the decimal equivalent chart is emphasized.

The instructional value is gained by having the student make a chart of all the dial settings required on a milling machine to make the graduated lines on the square. The dimensions are given in fractions on the print so that the student must convert them to decimal equivalents as the milling-machine dials are marked in thousandths.

Students readily recognize the necessity for accuracy in constructing a graduated square and work to less than given tolerances.

The process of making graduations on the milling machine also gives the student practice in machine hand-wheel setting. He learns the proper direction for turning hand wheels instead of making starts in the wrong direction. He discovers that end-play in a free moving screw requires that all settings have to be finished in one direction for accuracy.

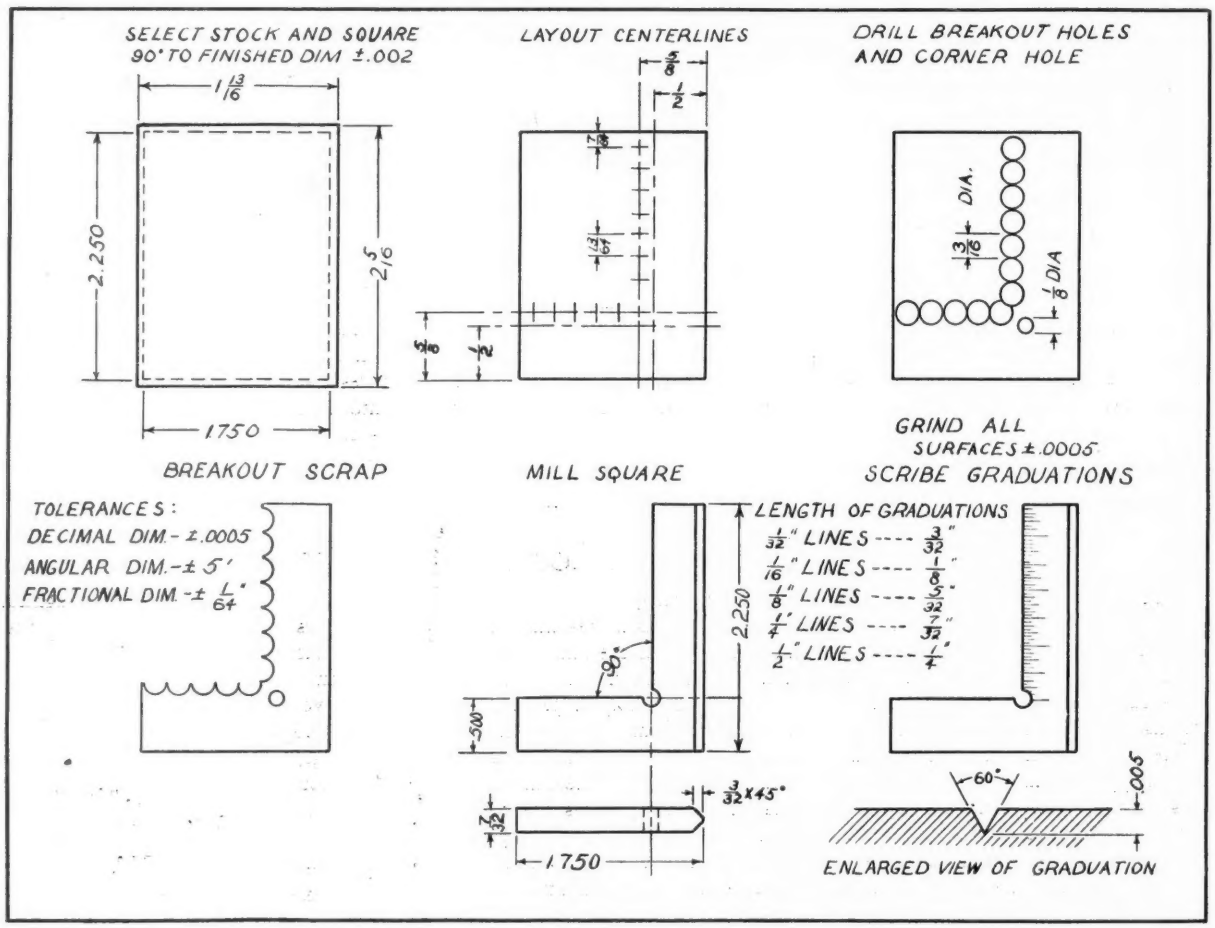
The discouragement that comes from spoiled work can be eliminated by grinding out incorrect graduations. It is not necessary then to remake the project. New marks can be readily made. Instructors will appreciate the value of this procedure in maintaining interest with beginners.

After the operations are completed, the square is carburized, hardened, and tempered.

More coming on films by Floyde E. Brooker:

In November, **"This Is How It's Done"**—helpful technics in film use.

Watch for this final instalment!



Modern Lamp

BY *Rufus Jacoby*

Here is a project that incorporates a maximum amount of educational value. Rufus Jacoby teaches in the Coolidge High School, Washington, D. C.

TESTED 55 INSTRUCTIONAL PROJECT

THIS lamp was designed for production by the advanced woodworking student with the following points in mind: (1) "form follows function" design; (2) built-up construction to conserve material and utilize scraps; (3) to permit conversion to fluorescent lighting fixtures; and (4) maximum educational value for the student.

The student may work from these plans or vary the size, shape, and proportions. The end of an orange crate or softwood scraps may be used for the staves and ends of the column. If the cross-cut saw has little set, the stave edges need no jointing. The staves are nailed and glued to the hexagonal ends.

The top end of the column is cut off, after turning, to give access to the space inside the column for the starter which is used with the fluorescent light. This permits conversion to fluorescent lighting when fixtures and bulbs are available. Circular fluorescent bulbs will be made for this type of lamp.

The leatherette covering for the column can be purchased from an upholsterer. The best quality leatherette is soft and pliable. The color of the leatherette should contrast with the color of the wood.

When applying the leatherette, saturate the fabric backing with any type of glue. An invisible joint is produced by overlapping the ends $\frac{1}{4}$" and cutting both layers of leatherette with a single-edge razor blade.

To turn the cap (and base) glue it to a wood chuck with paper between the cap and the chuck. This permits removal of the cap by wedging a 1" chisel in the paper joint, which splits the paper.

The cap and base are finished on the lathe (French polish) by holding folded cheesecloth saturated with lubricating oil and orange shellac to the revolving work.

BILL OF MATERIALS

6 staves	1 x $2\frac{1}{2}$ x $11\frac{1}{2}$	Softwood scraps
2 hexagonal ends	1 x $2\frac{1}{2}$ x $2\frac{1}{2}$	" "
1 cap	$1\frac{1}{2}$ x $4\frac{3}{4}$ dia.	hardwood
1 base	2 x $5\frac{1}{2}$ dia.	"
4 screws	$1\frac{1}{2}$ x No. 10	flathead
leatherette	13 x $10\frac{1}{2}$	

The student may check his plan of procedure with the following:

1. Make sketch or mechanical drawing.
2. Make bill of materials.
3. Outline steps in procedure.
4. Have sketch, bill of materials, and procedure checked and approved.
5. Make full-sized layout of the end of column to determine the size of stave and hexagonal end.
6. Set table saw at 30°—cut out six staves.
7. Tack two 3"-diameter pieces of 1" stock

(Continued on page 13)

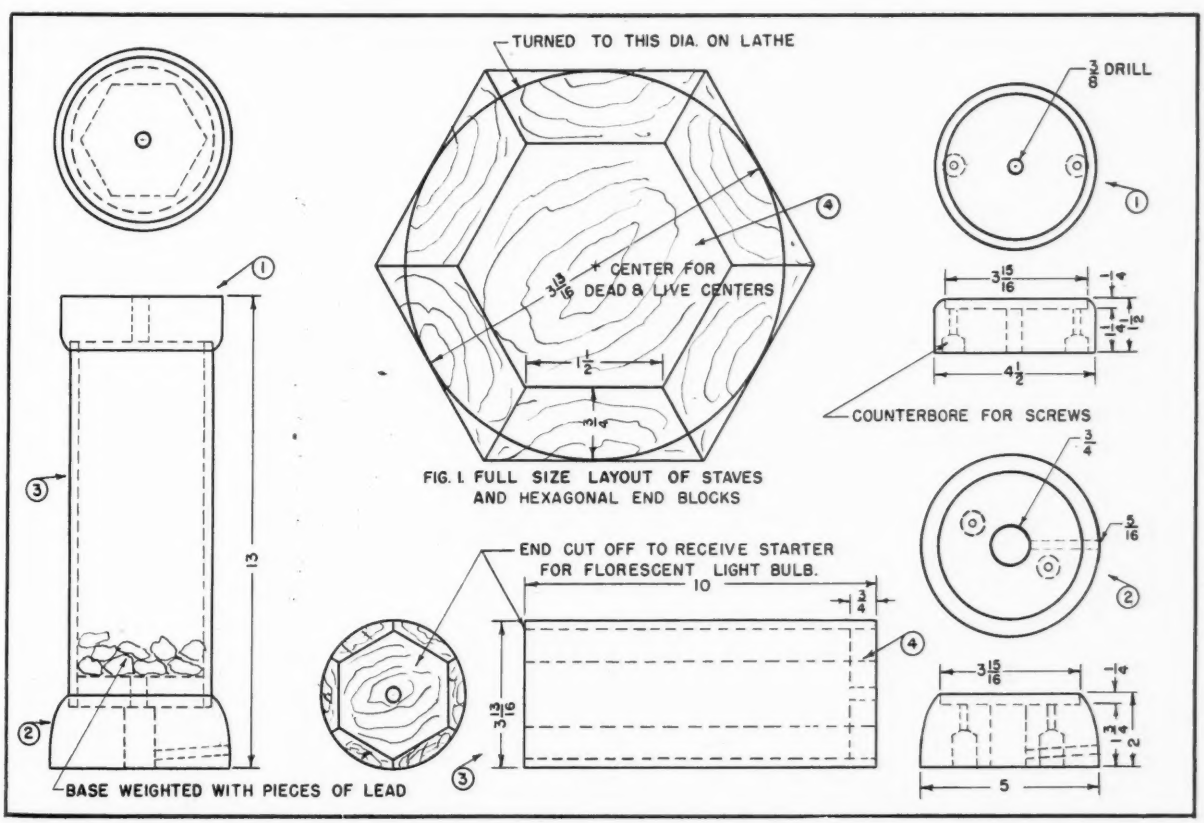

TURNED TO THIS DIA. ON LATHE
3/8 DRILL
CENTER FOR DEAD & LIVE CENTERS
COUNTERBORE FOR SCREWS
END CUT OFF TO RECEIVE STARTER FOR FLORESCENT LIGHT BULB.
BASE WEIGHTED WITH PIECES OF LEAD

FIG. I. FULL SIZE LAYOUT OF STAVES AND HEXAGONAL END BLOCKS

Electrically Operated Crossing Gate

Salvage materials can be used to build this popular project which involves basic operations in the realms of electricity and sheetmetal work. The author teaches in the Leyden Community High School, Franklin Park, Illinois.

BY *E. A. Rerucha*

TESTED INSTRUCTIONAL PROJECT

WITH the approach of the Christmas season and youthful enthusiasm for model railroading at its peak this project will be very popular with boys. The steps in construction and assembly are given in some detail. Instructors will wish to vary the procedures to fit their own plan of organization.

1. Make the solenoid first so that it

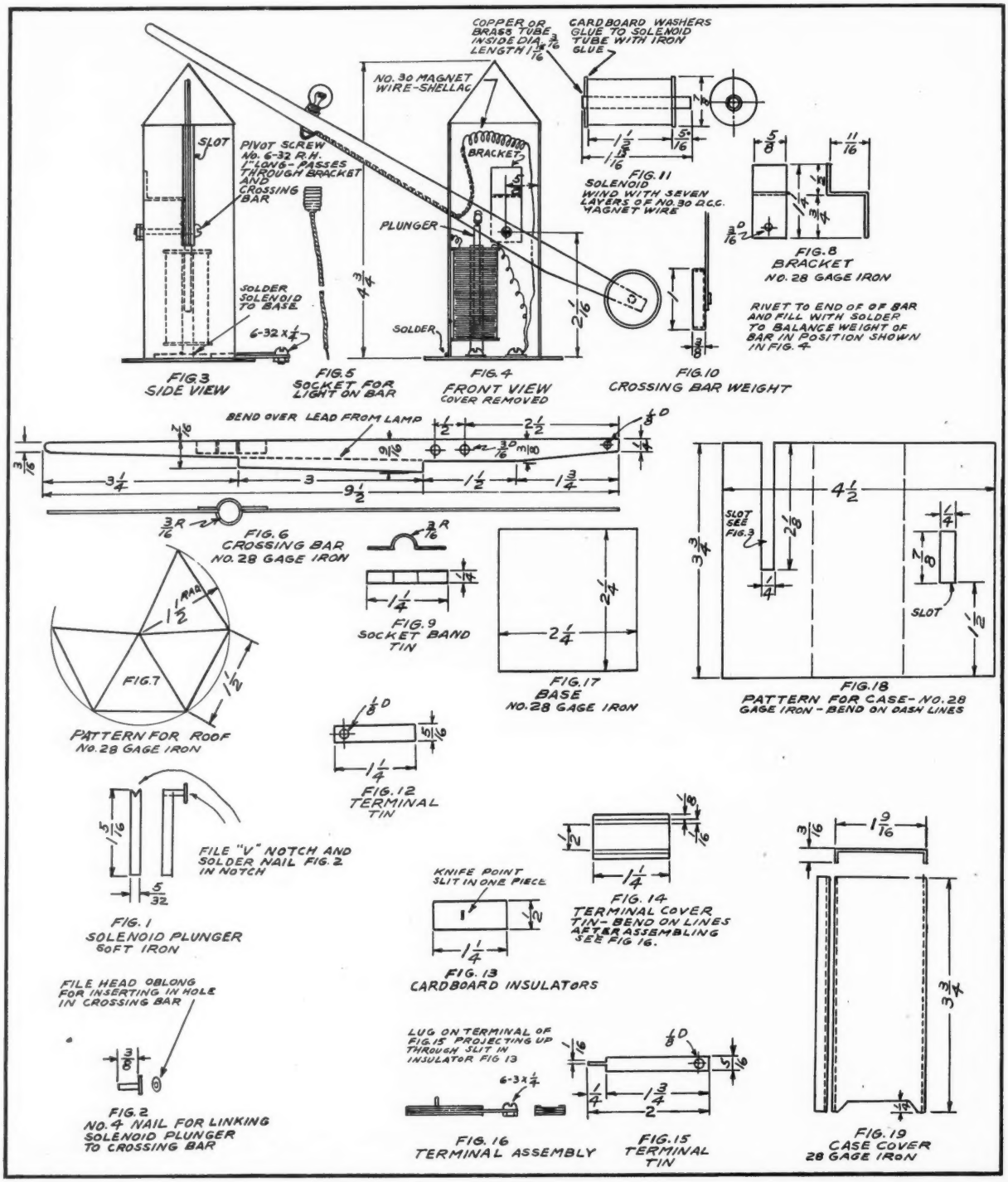


FIG. 3 SIDE VIEW
FIG. 5 SOCKET FOR LIGHT ON BAR
FIG. 4 FRONT VIEW COVER REMOVED
FIG. 10 CROSSING BAR WEIGHT
FIG. 11 SOLENOID WIND WITH SEVEN LAYERS OF NO. 30 D.C.C. MAGNET WIRE
FIG. 8 BRACKET NO. 28 GAGE IRON
FIG. 6 CROSSING BAR NO. 28 GAGE IRON
FIG. 9 SOCKET BAND TIN
FIG. 17 BASE NO. 28 GAGE IRON
FIG. 18 PATTERN FOR CASE - NO. 28 GAGE IRON - BEND ON DASH LINES
FIG. 7 PATTERN FOR ROOF NO. 28 GAGE IRON
FIG. 12 TERMINAL TIN
FIG. 1 SOLENOID PLUNGER 60FT IRON
FIG. 14 TERMINAL COVER TIN - BEND ON LINES AFTER ASSEMBLING SEE FIG 16.
FIG. 13 CARDBOARD INSULATORS
FIG. 2 NO. 4 NAIL FOR LINKING SOLENOID PLUNGER TO CROSSING BAR
FIG. 16 TERMINAL ASSEMBLY
FIG. 15 TERMINAL TIN
FIG. 19 CASE COVER 28 GAGE IRON

will be ready for assemblying by the time the other parts have been completed. Construct the spool according to the drawing in Fig. 11. The center tube may be a piece of copper or brass tubing or it may be formed from a rectangular piece of any non-magnetic sheet metal of sufficient strength. If it is to be formed, a rectangular piece 9/16" x 1-13/16" will be required. Bend over a round rod. Glue cardboard washers in position with iron glue and allow to set. Then wind with six or seven even layers of No. 30 D.C.C. magnet wire. Leave about 8" for making connections. Shellac the winding and leads.

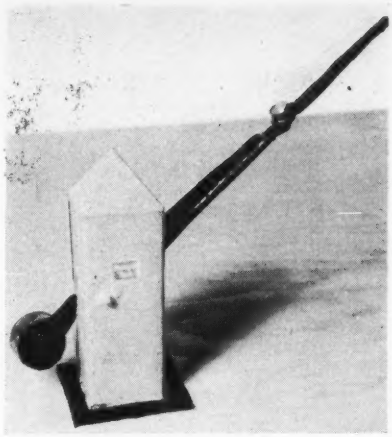
2. Make the solenoid plunger shown in Fig. 1 and solder a length of No. 4 flat-head nail (Fig. 2) into the notch. File head oblong vertically. The nail head may be inserted in the hole in the crossing bar by tilting upward and will not come out when plunger and base are in position after assembling.

3. Cut out the crossing bar (gate) shown in Fig. 6 from a piece of No. 28 gage sheet iron. Drill the holes. Prepare the miniature socket for the light as shown in Fig. 5 and the socket band shown in Fig. 9. The socket shell may be removed from the casing by giving it a slight blow with a hammer. Cut off about 1/8" of the rim of the socket. Solder socket in position on bar and also the socket band as shown in Fig. 6. Bend the flap on bottom of bar over the insulated lead from socket, being careful not to cut through the insulation. See Figs. 4 and 6.

4. Make the bracket supporting the gate bar, shown in Fig. 8, and the weight cup shown in Fig. 10. This is cut off from a round tin can about 1" in diameter. Punch a hole in the center of the bottom and rivet to the end of gate bar.

5. Cut out the case, Fig. 18; base, Fig. 17; and cover shown in Fig. 19 from 28-gage sheet iron. Bend case and cover to shape. The sides of the cover should be bent slightly more than 90° to fit tightly over the open-side edges of the case. Solder case to base.

6. Assemble plunger and solenoid and gate bar and bracket in case to determine position of solenoid and bracket. The bar should have enough clearance in slots in sides of case to swing up and down freely without binding. Mark position of the bracket on back of case and solenoid tube on base. Solder bracket and solenoid in position. Remove the screw on which the bar is pivoted to the bracket and drill a hole 3/16" in diameter in the back of the



case opposite the one in the bracket. Replace screw through gate bar, bracket, and back of case. Place two nuts on end of screw and lock together. Bar should be snug against bracket but free to move when the solenoid plunger pulls it downward. Pour melted solder in weight cup. Use enough to overbalance the weight of the bar on the other side of the pivot screw so as to return it to the "up" position immediately after the current is cut off from the solenoid.

7. Make roof, Fig. 7, and solder to case.

8. Make terminal shown in Fig. 12 and solder inside case bottom so that about 1" of it projects outside of the case. See Fig. 3.

9. Make insulated terminal parts shown in Figures 13, 14, and 15 and assemble as shown in Fig. 16. Bend the 1/16" x 1/4" lug on end of part shown in Fig. 15 at right angles and push the lug through the slit in cardboard insulator shown in Fig. 13. Place the other piece of cardboard under terminal and then assemble both in terminal case or cover shown in Fig. 14 by bending the edges of the tin over the edges of the cardboard with the lug projecting out at right angles. Make certain that terminal strip does not touch the case and that the edges of the case are pressed down firmly so that there is no chance for the terminal strip to move sidewise and become shorted. Solder the terminal case to bottom inside case and parallel to the other terminal. See Fig. 3.

10. Take a piece of the No. 30, D.C.C. magnet wire and coil as shown in Fig. 4. Solder one end to the lamp lead and the other end, together with one from the solenoid, to the lug on the insulated terminal. It is well to shellac the magnet wire to protect the insulation. Solder and tape the splice between the magnet wire and lamp lead. The purpose of the magnet wire coil is to give the gate freedom of movement. Solder the other lead from the solenoid to the case. See Fig. 4.

11. Place cover on case. Make certain that the bottom does not short the two terminals.

12. Enamel case as desired. Gate bar should be painted with alternate inclined black and white bars. Railroad symbols cut from time tables may be glued to case if desired to give it a more realistic appearance.

Modern Lamp . . . from page 11

together and lay out hexagonal end.

8. Cut ends on saw.

9. Nail and glue staves to ends. Let set six hours.

10. Locate centers of the ends of the hexagonal pieces for dead and live centers.

11. Turn to a parallel surface. Do not sand.

12. Glue leatherette to cylinder with cylinder held between lathe centers. Let glue dry.

13. Cut off one end on saw (10" length).

14. Get out stock for cap and base.

15. Glue cap and base to chucks (paper) between stock and chuck.

16. Turn cap. Turn base.

17. Finish on lathe. French polish.

18. Wedge work from chuck with 1" chisel.

19. Bore holes in cap and base for screws.

20. Assemble base and column with screws and glue.

21. Weight with lead or small stones.

22. Assemble cap and column with screws.

23. Wax entire job.

24. Evaluate.

Mass Production... from page 6

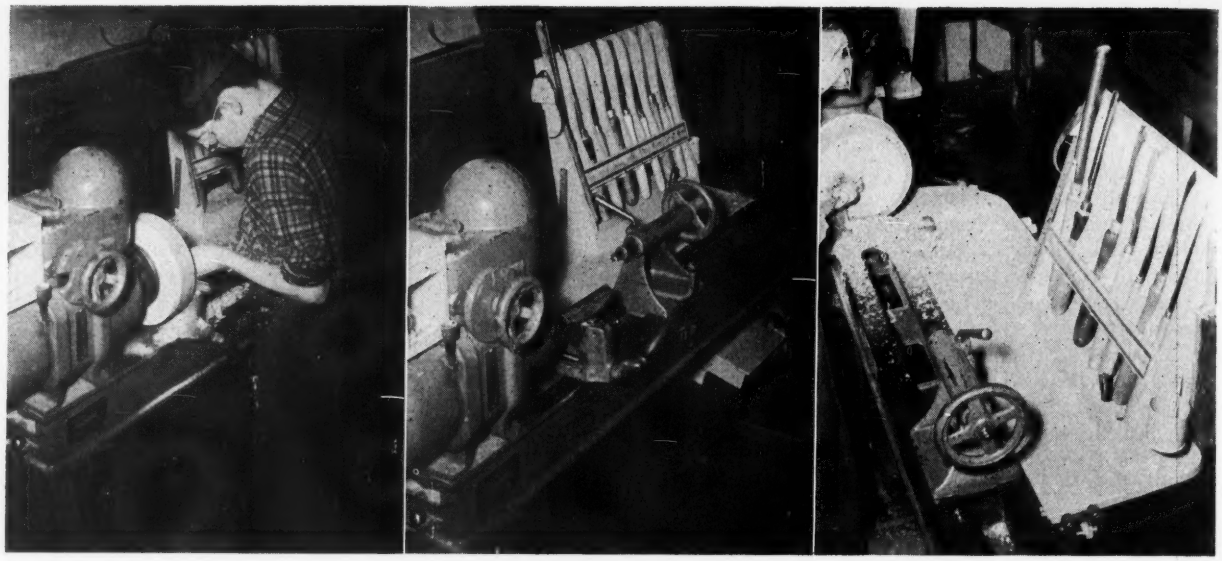
install on the air compressor new rings and air valves which had crystallized through constant wear.

In printing the games, a group of students devised an adjustable sliding bar jig for holding the plywood in position. This alone saved several hours in setting up for each printing operation.

One student, while he was drilling games, had trouble with the wood particles which the drill brought out, so he devised a paper fan to attach to the drill. As the drill rotates, the fan blows away the wood particles, increasing production by about 25 percent and eliminating the spoilage.

Another student designed a jig that measures where the leather handle should be placed and locates the hole for installing the screws.

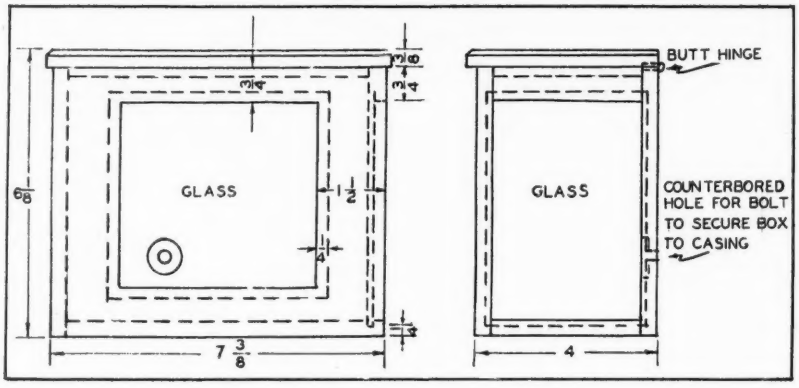
The writer, who has taught shopwork for several years, has had many occasions to observe the thinking processes of shop students. During this experiment in mass-production technics, he was constantly amazed at the depth of insight which the students displayed and at their ingenuity in devising methods of production. He is convinced that this type of program offers many possibilities as a unit of a regular course in industrial education in the school shop.



Wood-Lathe Accessory Arrangement

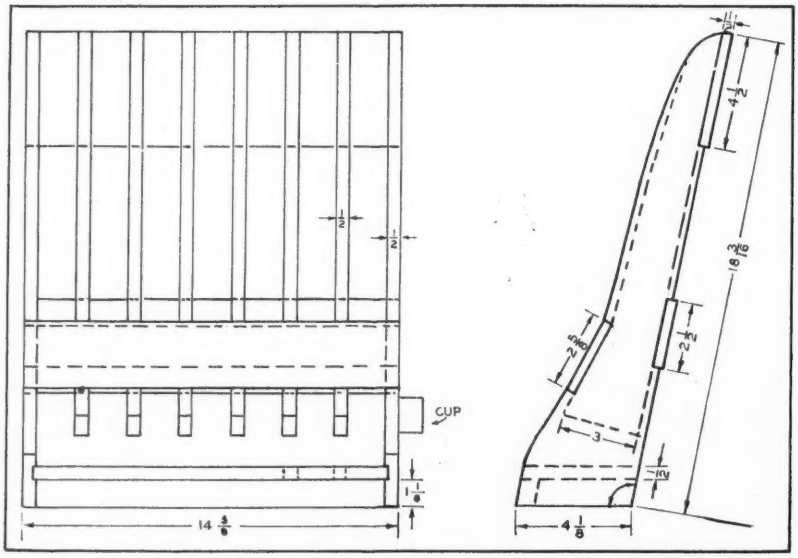
BY *Conrad Johnson*

Good housekeeping goes hand in hand with good workmanship. These items enable students to exercise the latter to gain the former. Conrad Johnson teaches in the Mt. Hebron Junior High School, Upper Montclair, N. J.



TESTED 33 PROJECT

THE lathe accessories racks described here have recently been set up in our shop and have proved very useful. These were designed with two thoughts in mind: to provide a definite place for each tool and accessory needed at the lathe and to make it possible to determine at a glance whether or not each item has been returned to its proper place.



A 1"x12"x4' shelf was fastened to the back of each lathe as shown in the picture on the right. It was mounted ¼" below the ways to allow clearance for the tool-rest holder. This shelf provides a very handy place to lay tools, templates, drawings, etc., and to fasten the rack and hangers for the other items.

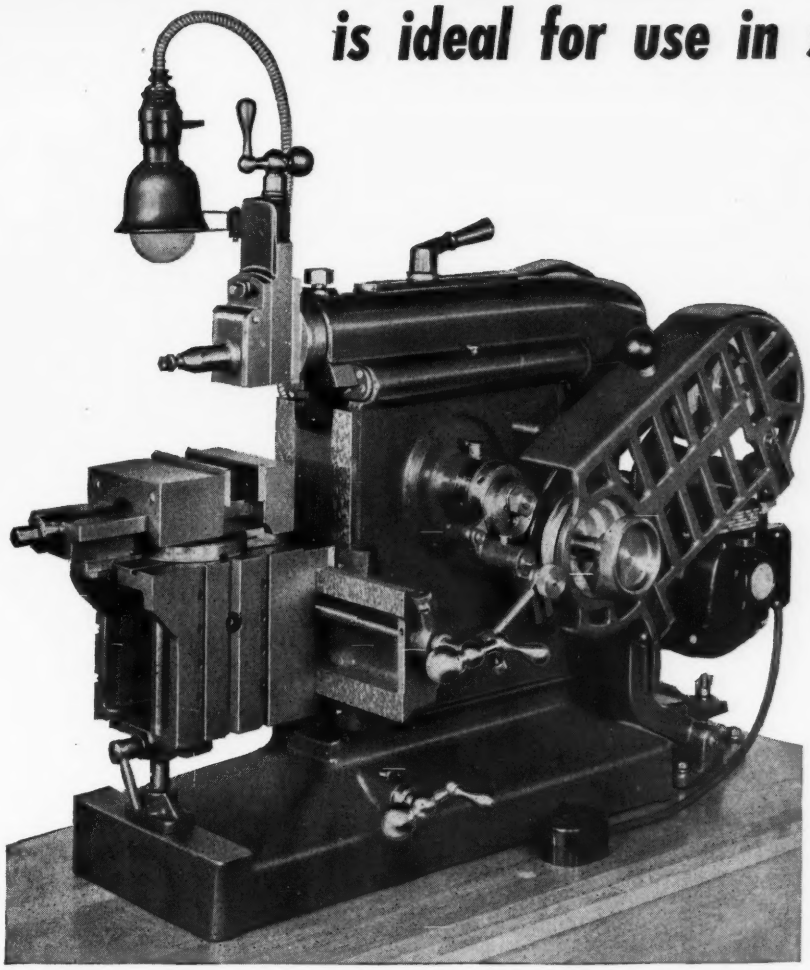
Hooks on the headstock end of the shelf are for the faceplate wrench and a mallet. A ½" diameter dowel set into the shelf batten makes a hanger for the spindle wrench.

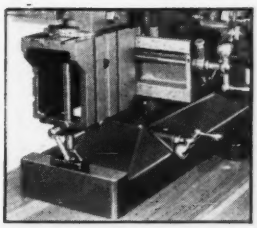
While not in use, the long and short tool rests are kept on their respective hangers fastened to the under side of the

(Continued on page 16)

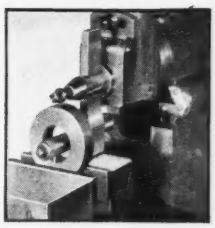
AMMCO 7" PRECISION SHAPER

is ideal for use in school shop!

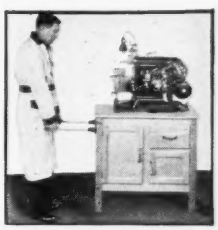




★ Has "VEE" Type Ways, comparable to those of large, expensive shapers.



★ Handles a wide variety of work.



★ Portable Model is mounted on maple cabinet.

Students quickly acquire ability to produce accurate work on this precision machine

Leaders in school shop instruction unreservedly recommend the AMMCO 7" PRECISION SHAPER. It is small in size, but it is mighty in efficiency and precision... It incorporates all important features of larger machines selling for hundreds of dollars more than the Ammco . . . and users of the Ammco tell us "it's the finest made". . . Simplicity of operation, plus special safety features, make this machine ideal for student use. A wide variety of work can be done on this shaper, and as one instructor has said —"it is a precision machine of a thousand uses."

Made for bench installation, or as a portable unit.

Write today for specifications and prices

AMMCO 2100 COMMONWEALTH AVENUE NORTH CHICAGO, ILLINOIS

A "MUST" IN EVERY ENGINE SERVICING COURSE

K&W Mechanical Method

OF RESTORING CRACKED ENGINE HEADS AND BLOCKS TO UNIMPAIRED SERVICE

TEACH THIS VITAL AND REMUNERATIVE ENGINE REPAIR METHOD

Repairing cracked or broken automotive and diesel engine blocks and heads by the K & W Mechanical Method is now standard practice with hundreds of fleet operators, engine builders and garages. It is used extensively by the Armed Forces and taught by ODT Training Schools. This method seals practically any heat, freeze or stress cracks in surprisingly fast time and the repair is guaranteed to last the life of the engine. No operation in servicing engines saves so much money in so little time.

NO ADDITIONAL SHOP EQUIPMENT NECESSARY

Tools required to make K&W Mechanical repairs are the type of portable power tools that are standard equipment in practically all school shops.

INFORMATION AND TRAINING

Complete information on the K & W Mechanical Method will be furnished you; or we will train your instructors without charge.

Learn more about the K & W Mechanical Method. Write.

K&W KERKLING & COMPANY
BLOOMINGTON, INDIANA

shelf, as is the tailstock wrench.

The chisel rack has spaces for the seven chisels, a holder for the calipers, hooks for 6″ and 12″ rulers, and a brush. A small tin can holds soap—lubricant for the tail-stock center. Two ¾″ diameter holes bored into the shelf of the rack provide spaces for the lathe centers when not in use.

Our faceplates are rather numerous and are often tied up with a job so no space on the lathe was provided for them. Instead they are kept on a separate wall rack when not in use.

With this arrangement the lathes can be cleaned readily with either brush or bellows as there are no accessories projecting above the shelf to catch the woodchips. The chisel rack is sufficiently open so that any dirt can be blown off easily.

A reinforced cigar box fastened to supports beneath the lathe bed serves as a receptacle for sandpaper. The supports, ¾″ x 1¼″ x 14″ strips, are bolted to the legs of the lathe at an angle of about 20°. At this angle the shavings tend to fall off or can be brushed off readily.

In the interest of safety, machine operators should wear goggles. This is especially true when small boys—7th and 8th graders—use machines that are designed for adults. Their height is such that many shavings and dust particles are thrown into their faces.

To keep goggles in good clean condition has long presented a problem to shop teachers. Often they are either carefully put away in a desk drawer or closet shelf, or hung casually somewhere on the machine.

If goggles are not immediately accessible when a student is about to use a machine, any "good intentions" are usually abandoned. Goggles invariably become grimy when left hanging on a machine and are not used because of their unsightly appearance or the nuisance of having to clean them.

To overcome these difficulties and to encourage young operators to observe necessary eye safety, the hinged-top box was fastened in a convenient spot to the motor casing by a ¼″ x 1″ bolt. A piece of clean cloth is also kept in the box for convenience in cleaning the lenses. The box is large enough so that the goggles can be put away without the necessity of folding. This feature makes for convenience and less wear on the goggles.

The front and side of the box have glass windows which serve two purposes:

(Continued on page 18)

Strictly Personal

ABOUT YOUR FELLOW TEACHERS

ELMER W. CHRISTY, supervisor of industrial arts for the Cincinnati, Ohio, schools and member of the Editorial Advisory Board of SCHOOL SHOP, has retired after serving in the former capacity for 37 years. . . . BYRON BERRY of the Kennett High School faculty, Conway, N. H., has been named teacher of machine shop and mechanical drawing at Exeter, N. H., High School. . . . JAMES CREESE, vice-president of Stevens Institute of Technology, has been named the sixth president of Drexel Institute of Technology, Philadelphia. . . . A. J. MCCLELLAND, formerly with Encyclopaedia Britannica Films, Inc., has been appointed director of educational sales for the Victor Animatograph Corp., Davenport, Iowa. . . . New officers of the Connecticut Industrial Arts Association are: president, HILDING O. SUNDBERG, Hamden; vice-president, RAY C. BANKS, Ansonia; vice-president, CHARLES QUINLAN, Stratford; vice-president, CLIFFORD SAWYER, Windsor; secretary, RALPH E. DUSO, Fairfield; and treasurer, JOHN J. LEWIS, West Hartford. . . . New director of the Manitowoc, Wis., School of Vocational and Adult Education is JOHN G. AUSMAN, formerly of West Allis, Wis. He succeeds A. L. NIMITZ who resigned after serving the school for 24 years. . . . LOWELL A. WELSH has been appointed director of the new Nebraska State Trade School which is offering a broad industrial-education program after serving as a war-production training center since its establishment in 1941. . . . PAUL J. FINK has retired as coordinator after serving the Oshkosh, Wis., School of Vocational and Adult Education for 40 years. . . . VICTOR J. SMITH has returned to his position as professor of industrial education, Sul Ross State Teachers College, Alpine, Texas, after a period of service with the Army at Fort Knox, Ky. . . . V. P. MCKINLEY, professor of trade and industrial education, University of Alabama, and member of the Editorial Advisory Board of SCHOOL SHOP has retired. . . . THOMAS G. BROWN, principal of the Boys Technical High School, Milwaukee, Wis., has retired after serving the school for 26 years. . . . New state director of vocational education for North Dakota is A. F. ARNASON who succeeds EDWIN ERICSON who has been named director of rehabilitation. . . . DON STARK, formerly of the Armed Forces, has been named industrial-arts instructor at Audubon, Iowa. . . . DANIEL DAVIS has been appointed industrial-arts teacher at Tappan Junior High School, Ann Arbor, Mich. He formerly taught at Roseville, Mich. . . . ROBERT E. CAMMACK, supervisor of agricultural education, has been named state director of vocational education for Alabama, succeeding J. B. HOBDY who has retired. . . . HUGH P. HARSHBARGER, director of industrial arts, Maine Township High School, Des Plaines, Ill., has resigned to become general manager of the Riley Feed Service, Des Plaines. . . . H. A. TIEMANN, state director of vocational education for Colorado, has resigned to become assistant superintendent in charge of adult and vocational education for the San Francisco, Calif., schools. His successor is E. C. COMSTOCK, former state supervisor of trade and industrial education. . . . J. GOULD SPOFFORD has retired as trade and industrial teacher-trainer in the New Jersey Department of Public Instruction and his place has been taken by JOSEPH M. FAIR, supervisor of trades and industries, who has been succeeded by STANLEY PERKINS.

Sheldon
VOCATIONAL EQUIPMENT
Sheldon Equipment for the School Shop has, in the past, set the standard for comparison. As we face the demands of a postwar era . . . an era which calls for greater progress and achievements . . . Sheldon planned equipment and Sheldon planned shops will continue to offer the maximum in utility and dependability.
What Sheldon Planning Engineers have accomplished for others is a dependable index of what can be done for you. Acquaint us with your shop needs and your planning problems . . . Sheldon Planning Engineers will be happy to work with you.
LABORATORY AND VOCATIONAL Furniture
E. H. SHELDON & COMPANY
MUSKEGON, MICHIGAN

IN THE Morning Mail . .

[Brief comments about SCHOOL SHOP and the field it serves are invited. Address the Editor, SCHOOL SHOP, Ann Arbor, Michigan.

Gentlemen:

Reading every copy of your magazine from cover to cover, I noticed that very few discussions have been published. I have in mind *opinions* of teachers (not administrators) on common problems to bring out representative conclusions and not merely specific attitudes.

Examples:

1. We have vocational education and industrial-arts education—both valuable in their own fields—but do we define them actually in their activities? Do not administrators and many teachers confuse them, making them identical, expecting the same results?

2. What is the attitude of industrial-arts shop teachers toward machine training as being more valuable than basic or fundamental training of handwork and theory?

3. Is industrial arts general education or specific specialized technical education as we often find it in larger school systems?

4. What and how much do modern machine operations contribute to the physical and mental development of a boy or girl besides preparing for employment?

5. Shall industrial arts emphasize in its concept the upkeep of personal properties such as maintenance of home and conveyance, hobby-crafts, etc., rather than finished occupational skills?

6. Is industrial arts founded on technical, occupational exploration and guidance to help a student find his field and level (capacity)?

7. Are not technical high schools swept off their feet by sudden introductions of technical developments such as aviation at the present time? Do we not throw too much weight into those subjects forgetting that they are but new applications of old physical principles requiring very little additional elementary shop skills, but extensive theoretical training and experimentations?

There are many other topics and problems too numerous to mention. Why do not shop teachers voice their opinions more often publicly in order to create a better understanding among themselves and with administrators of varying sizes of systems? Why do we hear the statement, "You do so, and I do so and so," rather than discussions with varied approaches to common problems. Remember we are interested in education and not morely in job training. Do you think it worth while to stimulate such discussions in SCHOOL SHOP?

G. A. BECKER,
Lakewood, Ohio.

[The good shop instructor, like all good teachers, seeks to make changes for the better in the minds and actions of his students. SCHOOL SHOP welcomes descriptions of *how* teachers attempt to make those changes and details of *what* changes the teacher hopes to make. *The Editor.*]

Gentlemen,

Please send a copy of the June 1945 SCHOOL SHOP, the one in which you list the suppliers of all commodities used in industrial education. Please accept my thanks in advance for this magazine which I know will be very helpful in carrying out our postwar plans.

WALLACE C. KIRK,
Supervisor of Educational
Supplies and Equipment
Baltimore, Md.

[Readers of SCHOOL SHOP will find the June Suppliers Directory of constant help during the school year as they order equipment and supplies, especially if expansion of the shop facilities is anticipated. May we suggest that you keep your copy readily available for such use. *The Editor.*]

. . . compare a SHELDON S-56 Precision lathe with all other 10" lathes in the moderate priced field, and you'll find more accuracy, more capacity, more convenience, more design, more quality . . . *from any angle just more lathe.*

The SHELDON S-56 lathe has a bed length of 56", with rigid T-girted bed with 2 V-ways and 2 Flat ways which are ground and hand scraped to .0005" of both lateral and parallel alignment. Lead screws are cut on the finest Pratt & Whitney "super precision" lead screw machine. The S-56 lathe with 56" bed is mounted on a rigid 5 drawer steel bench (S-44 with 44" bed on a 4 drawer steel bench) which houses an efficient 4-speed (8 spindle speed) underneath motor drive. Each come with full quick change gears, power longitudinal and cross feeds and standard big lathe features.

- Heavy bronze bearings
- 1" Collet capacity
- 11¼-inch swing
- Double-walled apron
- Large hardened and ground spindle
- Extreme accuracy
- Convenient controls
- Underneath V-belt motor drive
- All Steel Bench

SHELDON MACHINE CO., INC.
4260 N. Knox Avenue Chicago 41, U.S.A.
Builders of Good Lathes since 1919.

Accessories . . . . . from page 16

that of keeping the goggles in evidence (as a reminder) although protected, and as a convenience in checking the lathe at the end of the class.

The box was designed to accommodate the standard spectacle-type goggles and for mounting on our lathe and grinder. The box is of ⅜" stock fastened together with glue and brads. The glass is set in a recess routed into the front piece and held with two glazier points on each side. The end piece of glass is set in a saw kerf cut in the front, back, and bottom pieces. The top edge of the glass is fitted into a rabbet cut into a piece ⅜" x ¾" x 2" as shown in the sketch.

TRAIN YOUR SHARE of the 25,000,000*—

and have everything you need to do the job right

A GIGANTIC job today faces America's schools—the training, for vast postwar production, of returning service men and women as well as retraining those who have been in the war effort.

No school in any community should keep these eager trainees waiting—or take longer than necessary in the training—because of too little, or too old, machines, equipment or supplies.

We of Brodhead-Garrett are bending every effort to see that schools, large and small, get everything they need—on time. As School Supply Headquarters, our catalog is filled with all essential machines, equipment, and supplies for helping you establish, or enlarge and modernize, your training department. Shipments can be expedited, and duplicate routine avoided, if you make up your entire list of needs from it now, and send in your complete order at one time.

**Estimated by The Saturday Evening Post*

BRODHEAD-GARRETT CO.

"Supplying Defense Training Needs to Schools in all 48 States"

CLEVELAND 5, OHIO

your NEW

DURABONDED

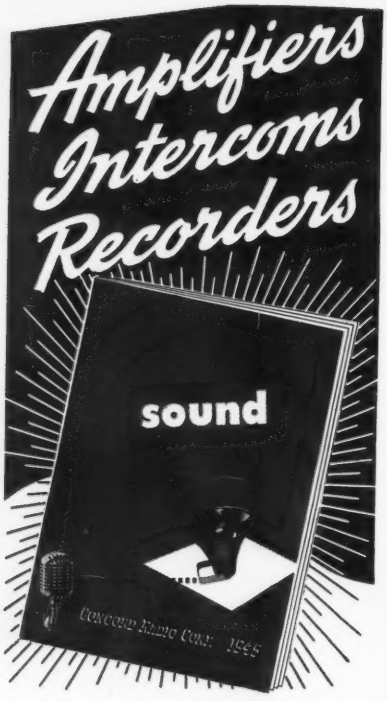
Classroom Chart

The newest development in coated abrasives is the Durabonded—hardened bond process. Behr-Manning's new 14" x 18" wall chart features actual samples of the new product and tells the what, how and why of the Durabonded process. Complete with grit size, backing and abrasive recommendations for metal preparation, roughing and finishing, the new chart is available without charge to vocational shop and industrial arts instructors.

Drop a postcard or use the coupon to obtain your copy.

BEHR MANNING
(Division of Norton Company)
TROY, N. Y.
Educational Service Department

To:
BEHR-MANNING, TROY, N. Y.
EDUCATIONAL SERVICE DEPARTMENT
Please send me NEW Durabonded Chart.
Name..... Title.....
School .....
Address .....
City..... Zone..... State.....



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"Sound Equipment"—ready now—a new up-to-the-minute Concord folder illustrating and describing our complete line of Amplifiers, Intercoms and Recorders AVAILABLE FOR IMMEDIATE SHIPMENT.

Amplifiers—ranging in output ratings of 17 watts to the largest requirements. Complete listing of speakers, microphones and essential equipment also included.

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Engineering Service—Our engineering service is at your command, without charge, to answer any and all "Sound Equipment" questions.

Mail the coupon below for your copy of "Sound Equipment" now.

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CONCORD RADIO CORP.
901 W. Jackson Blvd., Dept. D-105
Chicago 7, Illinois
Please send me at once copy of your new "Sound Equipment" folder.
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Address.....
City.....State.....

NEWS

What's Doing in the Field of INDUSTRIAL EDUCATION

Change

THE Policies Board of Epsilon Pi Tau, national honorary professional fraternity in industrial arts and vocational education, has appointed Dr. John A. Whitesel of Miami University as Acting National Secretary. The Executive Secretary, Major William E. Warner of the Ohio State University, is now serving in General Eisenhower's command in Europe. The fraternity has 22 chapters across the United States from Massachusetts to California. The national office is now located in Oxford, Ohio.

Britain Moves

WHILE the U. S. is dismantling its war vocational training programs and Congress is delaying action on bills to expand vocational education for peace, comes this announcement from London:

A half a million new skilled workers within five years is the goal of a huge British vocational training program outlined by the Ministry of Labor. A dispatch from London (August 9) says that trades will be taught to men and women leaving the armed forces as well as workers formerly employed in war industries. At least 50 training centers will be established under the new program. Trainees will be paid while learning. Men will receive $16 a week; women $11 a week; with additional allowances for dependents. Training will last from three to 12 months. Priority will be given to trainees preparing for the building trades, since Great Britain must rebuild more than 1,000,000 bomb-shattered homes.

Counselors

UNUSUAL success has attended the cooperative counselor training program which has been operated in Detroit, Mich., during the past three summers under the auspices of the University of Michigan, Wayne University, and other educational institutions with the cooperation of the Chrysler Corp., the Henry Ford Trade School, and the Detroit Retail Merchants Association. Over 300 students were enrolled in the program for 1945 which was directed by Dr. Frank Dalton of the University of Michigan with Merrill Hamburg of Wayne University as coordinator. The guidance training courses in industry and retailing provide an opportunity for teachers, counselors, and school administrators to secure summer employment in industrial plants or selected retail stores and at the same time to receive related instruction given by representatives of both employers and the sponsoring universities. The purpose of the program is to expand the background of counselors and teachers so that they may do a more effective job with students. The work carries college credit. Those in the industrial section of the program work at regular jobs in the factories and receive regular wages. A system of job rotation is employed so that students have an opportunity to work at different types of activities. Industrial organization is explained in a series of talks by executives of the sponsoring firms. The sponsoring educational institutions bring to the group experts in the fields of guidance, labor relations, and kindred subjects. Many shop teachers have enrolled to expand their knowledge of industrial processes and practices.

Week

THE 25th annual observance of American Education Week will be celebrated November 11-17, 1945. Since its modest beginnings in 1921, American Education Week has come to be a great annual nation-wide celebration of the ideals of free public education. It provides an opportunity to interpret to the people the meaning of education for free peoples.

The theme for the 25th observance is "Education to Promote the General Welfare." Concern for the general welfare is the great need of the world today. This is true if individuals are to have happy and challenging lives, if our nation is to find its way to a prosperous and harmonious future, and if the world is to achieve a stable and enduring peace. The schools have a major role to play in developing citizens who will work together for the common good.

World War II was won because we endowed our young men with the best possible training and equipment for war. If this victory is not to be a hollow triumph, we must plan to prepare our young people with equal vigor for the tasks of peace. American Education Week 1945 is an opportunity to stress this idea throughout the nation. America owes it to itself to improve its schools.

For a complete list of the materials available to help you in planning your program for American Education Week 1945 write to the National Education Association, 1201 Sixteenth St., N. W., Washington 6, D. C.

They're easier to reach with

"SUPERRENCHES"

● Awkward, hard-to-reach adjustments present no problem for these slim, taper-jawed "Superrenches". Forged from alloy steel, they are thin enough to operate half nuts yet their strength is equal to that of the strongest wrenches made.

Williams "Superrenches" are available in a wide range of patterns, with openings from 3/16" to 3-1/8". When wartime regulations are lifted they again will be furnished in bright chrome finish. Write for descriptive literature. J. H. Williams & Co., Buffalo 7, New York.

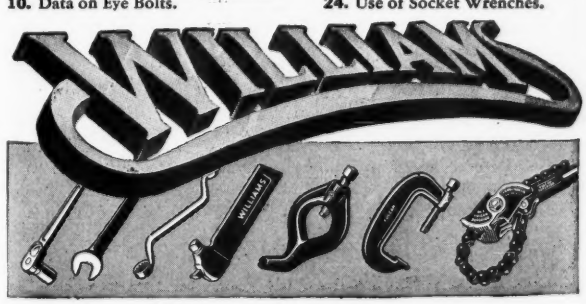
Free DATA SHEETS

Mailed postpaid on request — Order by number.

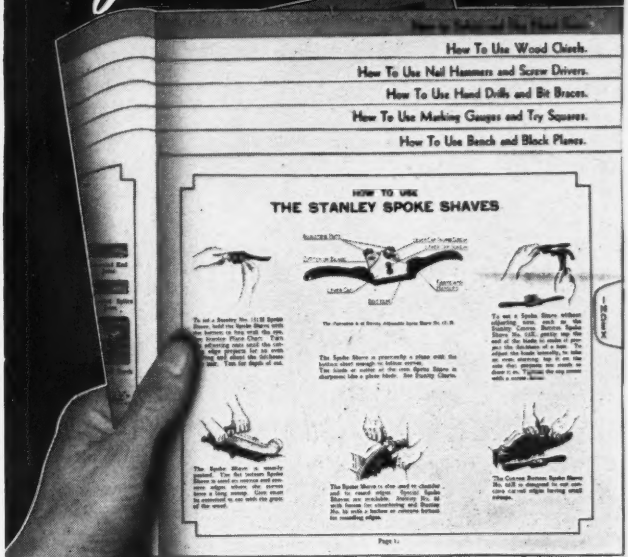
1. Data on "Superior" Wrenches.
2. Data on Boring Tools.
3. Data on Chain Pipe Tongs.
4. Data on "Supersocket" Wrenches.
5. Data on Lathe Dogs.
6. Data on Chain Pipe Vises.
7. Data on Turning Tools.
8. Types of "Superior" Wrenches.
9. Use of "Supersocket" Wrenches.
10. Data on Eye Bolts.
11. Data on "C" Clamps.
12. Use of Cutting-Off Tools.
13. Use of Knurling Tools.
14. External Thread Cutting.
15. Internal Thread Cutting.

16 to 21. Six Data Sheets on grinding cutters for Tool Holders.

22. Use of Open-end Wrenches.
23. Use of Lathe Dogs.
24. Use of Socket Wrenches.



AUTHORITATIVE *for Teaching*


How To Use Wood Chisels.
How To Use Nail Hammers and Screw Drivers.
How To Use Hand Drills and Bit Braces.
How To Use Marking Gauges and Try Squares.
How To Use Bench and Block Planes.
HOW TO USE
THE STANLEY SPOKE SHAVES
INDEX

THE STANLEY TOOL GUIDE

The knowledge and experience of years of tool manufacturing and tool use are combined in "The Stanley Tool Guide" to give the school and shop instructor a great store of visual teaching aid.

More than 2000 illustrations, with instructions covering the use of boring and cutting tools, squares, gauges and jigs and other wood and metal working tools, are included in this one book.

Send today for your copy – and extras for the use of your class – at just 25¢ each postpaid. (10 or more copies, 15¢ each – 25¢ each in Canada.)

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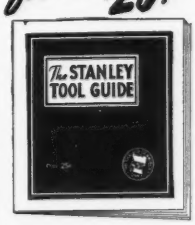


STANLEY TOOLS, Educational Dept., New Britain, Conn. SS-1045
Enclosed find (¢). Please send ( ) copies of the Stanley Tool Guide, postpaid.

Name .....

Subject You Teach .....

School .....

City ..... *Zone*..... *State*.....

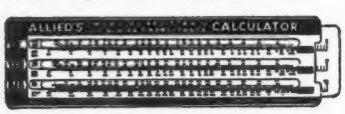
Home Study Course in Science of Measurements

A new educational feature is announced by DoALL. Realizing the value of a wider knowledge of precision measurement, DoALL has prepared a group of eight lessons for home study, intended for industrial and vocational gage-training programs.

The eight lessons comprising this correspondence course include: Progress in Precision, Inspection and Care of Gage Blocks, Uses of Gage Blocks, Accessories of Precision, Sine Bar and Its Uses, Measuring to a Millionth with Optical Flats, DoALL Comparator and Threads and Gears, and How to Set Up a Mobile Inspection Unit.

The lessons are amply illustrated and contain many tables and formulas. They are clearly and concisely written with complete data and questions and answers. Detailed information on how they may be obtained can be secured from Continental Machines, Inc., 1301 Washington Avenue S., Minneapolis 4, Minnesota, *or by checking No. 8 on the coupon below.*

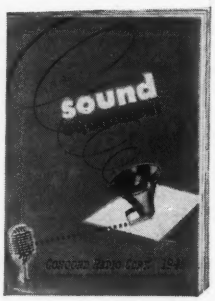
Parallel-Resistance and Series-Capitance Calculator



Allied Radio Corporation, Chicago, has recently released a new parallel-resistance and series-capitance calculator. Essentially a slide-rule device, the new calculator provides a rapid and accurate means of determining the reciprocal of the sum of two reciprocals. It indicates in one setting the numerous pairs of resistances which may be connected in parallel or capacitances in series to provide any required resistance or capacitance value. Range: 1 ohm to 10 megohms; 10 mmfd. to 10 mfd.

Priced at 25 cents. Available from Allied Radio Corporation, 833 West Jackson Blvd., Chicago 7, Illinois, *or by checking No. 9 on the coupon below, and enclosing 25c.*

Concord Offers New Sound Equipment Catalogs

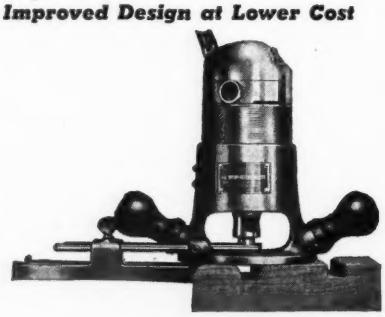


Concord Radio Corporation, of Chicago and Atlanta, has just published new folders presenting complete listings of "available now" sound equipment units and accessories. These folders are up-to-the-minute, detailed, and illustrated catalogs covering the complete Concord line of amplifiers, inter-communication systems, recording equipment, and accessories.

Amplifiers and Boosters covers models ranging in output ratings of 17 watts to 75 watts A. C. *Intercommunication Systems* lists master and substation combinations for every purpose from 2 to 100 stations.

Copies of these listings may be had without cost from Concord Radio Corporation, 901 W. Jackson Blvd., Chicago 7, Illinois; 265 Peachtree Street, Atlanta 3, Georgia; *or by checking No. 10 on the coupon below.*

Improved Design at Lower Cost



Stanley-Carter Router No. RS4A, is now offered in an improved design at a lower price. In this router the motor casing is threaded and turns in the router base for accurate, quick and safe adjustment to exact depth of cut. Used in the base, RS4A router performs all routing operations in wood and plastics. Taking the motor unit and applying various accessories available, it can also be used for carving and shaping.

Printed folders on the RS4A router and bits and cutters will be sent on request from the Stanley Electric Tools, Dept. C., New Britain, Connecticut, *or by checking No. 11 on the coupon.*

Hickok Offers Catalog No. 144

A new catalog showing available electronic and radio service equipment is offered by the Hickok Electrical Instrument Company, Cleveland, Ohio.

It includes complete details and illustrations of the most popular radio service instruments in greatest demand. Dynamic mutual conductance and its importance is also explained.

The illustration shown above lists the material described. For a free copy of this extensive catalog, write the Hickok Electrical Instrument Company, 10514 Dupont Ave., Cleveland 8, Ohio, *or check No. 12 on the coupon.*

New Literature

Grinders and Buffers. An interesting 20-page catalog illustrating a complete line of buffers and grinders has recently been issued by the Queen City Machine Tool Co. The machines shown have a range of 1/3 H.P. to 10 H.P. in capacity. Complete specifications, prices, and operating details of the various models are included. Write Queen City Machine Tool Company, 219 E. Second St., Cincinnati 2, Ohio; *or check No. 13 on the coupon.*

Craft Supplies. The American Handicraft Company has recently released an 80-page second edition catalog, listing thousands of hard-to-find craft supplies and items. Priced at 10c, the catalog will be sent *free* when requested on school stationery from American Handicrafts Co., Inc., 45-49 S. Harrison St., East Orange, N.J.; *or by checking No. 14 on the coupon.*

The Secrets of Good Projection. A 32-page illustrated booklet written by an experienced projectionist, giving complete information on getting the best projection results under all conditions. For a Free copy, write Radiant Manufacturing Corporation, 1192 W. Superior St., Chicago 22, Illinois, *or check No. 15 on the coupon.*

Each item listed above is numbered. Check the numbers of the items you want, and mail the coupon, properly filled in, to . . .

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Ann Arbor, Michigan

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An enthusiastic teacher writes: "The Hy-Flect Glass Beaded surface of our Radiant Screen makes a remarkable difference in our projected pictures. Colors are so much more brilliant. Black and whites show much greater contrast. Our student interest in our visual aids has visibly increased—now that we have discarded our make-shift screen . . ."

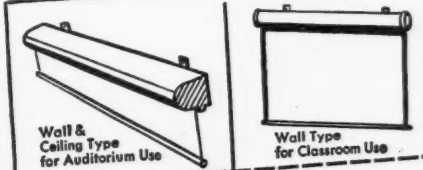
This is typical of letters we receive daily from leaders in visual education—and explains why Radiant Screens are favorites in thousands of classrooms and auditoriums all over the country.

The Radiant Screen here illustrated is Model DS—portable, sturdy, compact, easily set up, quickly adjustable.

The Radiant Line includes a complete range of wall, ceiling and table models in sizes 22" x 30" to 20 feet by 20 feet and larger.

Send for FREE Book on Projection

Mail coupon today for FREE copy of 32 page illustrated book, "The Secrets of Good Projection," written by experienced projectionist. Gives complete information on getting best projection results under all conditions—including important information on screen sizes, lens sizes, projection distances and many other useful facts. Also for free circular giving specifications, prices, etc. of Radiant Screens for all purposes.



Radiant Manufacturing Corporation
1192 W. Superior St., Chicago 22, Ill.
Gentlemen: Without obligation, please send me free copy of 32 page illustrated book, "The Secrets of Good Projection." Also circular showing complete line of Radiant Screens.
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BETTER SCREENS FOR BETTER PROJECTION

Instructional RESOURCES

An Introduction to Electronics. Hudson. New York: The Macmillan Company, 1945. Pp. 97 + 19 inserts. $3.00.

This new book aims to give the reader, in simple and clear terms, the basic understanding of electronics necessary to talk and write intelligently about any of its myriad new developments and applications. It is fundamentally a reference book, and not a textbook.

The book begins with a nonmathematical explanation of the basic laws and phenomena of electronics—the structure of matter as it is now known and the nature of an electric current in a gas, a liquid, a solid, and a vacuum. Although simply written, these chapters are not elementary for they give an accurate idea of the meaning of such terms as "isotopes," "quanta of energy," "ionization," "positrons and mesotrons," and the fundamental electrical units of measurement and their relationships.

Following chapters show how these basic laws operate in electronic tubes, photo-tubes, and other fundamental devices; and how, in turn, these devices have been put to use. The construction of each device is clearly explained and illustrated; the ways in which it is used today are briefly described, and the future possibilities indicated.

Ralph G. Hudson is professor of electrical engineering, and chairman of the courses in general engineering and general science at the Massachusetts Institute of Technology.

Procedure Handbook of Arc Welding Design and Practice. Eighth Edition. Cleveland: The Lincoln Electric Company, 1945. Pp. xii + 1312. $1.50 in U. S.; $2.00 elsewhere.

The eighth edition of this standard handbook of the welding field has been entirely revised to include the latest data on new arc-welding methods and equipment. Much of the new material covers significant welding applications developed in various phases of war production which heretofore have not been published due to restriction.

In addition to standard data on welding symbols, speeds and costs, characteristics of metals, preheating, stress relieving, approach to welding design, and other pertinent material, the eighth edition includes 16 new subjects, such as new cost tables; new technics; mathematical calculations for new weld-design structures; latest steel specifications; underwater cutting; shop ventilation; maintenance of equipment; methods of testing; and filler metal specifications for arc welding electrodes. There are 1647 illustrations.

Coordination in Vocational Education. Department of Vocational Education. Ann Arbor: University of Michigan, 1945. Pp. vi + 104. Paper covers; spiral binding. $0.50.

This booklet embodies the results of a series of discussions held by experienced coordinators in Michigan during conferences called by the State Board for Vocational Education. It is an arrangement and expansion of the many helpful ideas expressed during these meetings.

The document will serve as an aid to those who have just assumed or are about to assume the responsibilities of a coordinator.

The table of contents includes American Apprenticeship; Coordination; Duties of the Coordinator; Determining Training Possibilities in a Community; Policies of the Local School System; State Plan for Apprenticeship; Selecting Candidates; Advisory Committees; Agreements; Maintaining Sound Relationships; Suggestions on Teaching; Related Instruction Material; Process Schedule; Legislation Affecting Apprenticeship.

The Machinists' and Draftsmen's Handbook. Wagener, Arthur. New York: D. Van Nostrand Company, Inc., 1945. Pp. xiii + 662. $4.50.

This handbook presents in one small volume a reference work for machinists and draftsmen that contains all of the basic information required in a great majority of their average assignments. There has been a critical selection of material. Every effort has been made to make the book small and compact, but at the same time to present illustrations, examples, and solutions to standard problems, especially those of a mathematical nature.

The table of contents includes: symbols and mathematics; parts of the circle; areas; volumes; geometrical constructions; weights and measures; triangulation; drills; threads; spur gearing; milling tables; tapers; speeds, feeds and cutting tools; dies and presses; metals; strength of materials; mechanics; logarithms.

Albert M. Wagener is instructor of shop theory at the Ford Trade School, Dearborn, Michigan; Harlan R. Arthur is supervisor of instruction for the Naval Training School in Dearborn.

Occupational Instruction, How to Analyze and Organize for Teaching. Bollinger, Weaver. New York. Pitman Publishing Corporation, 1945. Pp. viii + 136. $2.25.

Describes how to analyze a training problem and organize a course of instruction in a practical and systematic way. The procedures proposed are applicable to any type of training program in school, plant, or business. Step by step, this text explains the way to determine *what* is to be taught, and *how* to proceed in organizing the material into a course of instruction. The problem of course instruction is approached from the standpoint of the teacher as well as of the administrator, with special attention to the guidance of those who do the actual teaching.

All procedures have been developed by the authors through eight years' experience in the training of vocational teachers. The simple and practical method embraces what is to be taught, the sequence of instruction to be followed, the work to be done by the learner, the lessons or instruction topics to be covered by the instructor and when they should be given. Teaching aids and material needed by the instructor, as well as a testing program, are included.

Elroy M. Bollinger and Gilbert G. Weaver are members of the New York State Department of Education.

Shopwork on the Farm. Jones. New York: McGraw-Hill Book Company, Inc., 1945. Pp. xiii + 486. $2.24.

This book has been prepared to serve as a text and reference book for farm shopwork. It deals directly with tools, materials, operations, and processes, rather than with jobs or projects; although at the end of each chapter a list of suggested jobs and projects is given to correlate with the material covered. The text, however, can be used with any projects or jobs that meet local needs or conditions.

Organized around all the activities of the farm shop, it includes sections on equipping a farm shop, sketching and drawing, tool sharpening, woodwork, metalwork, welding, concrete, rope, and harness work, machinery, repair, and the maintenance of electrical equipment. Many of the textual sections of the book are duplicated in picture form, with hundreds of special drawings and diagrams used to illustrate steps of processes.

Mack M. Jones is the professor of agricultural engineering at the University of Missouri.

The Electrolytic Capacitor. Georgiev. New York: Murray Hill Books, Inc., 1945. Pp. xii + 191. $3.00.

This book describes the design, construction, manufacture, functions, and testing of dry and wet electrolytic capacitors. It explains the operation characteristics of the various types and indicates both their useful applications and their limitations.

In addition to all this other practical material, there are incorporated a great many recorded observations and experimental data on electrolytic cells; 80 illustrations, consisting of photographs, drawings, photomicrographs, and oscillograms; a glossary of technical terms, and extensive bibliography; a list of hundreds of U.S. and foreign patents issued during the period from 1891 to 1942.

Alexander M. Georgiev is a member of the American Institute of Electrical Engineers and holds 16 United States patents in the field of electrolytic capacitance.

Building Trades Blueprint Reading. Dalzell. Chicago: American Technical Society, 1945. Part I, Fundamentals, $2.00; Part II, Specifications, Blueprints, and Examina-

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J. Ralph Dalzell is the head of the architectural engineering department of the American School.

How to Run a Film Library, recently published by Encyclopaedia Britannica Films, Inc., is a functional manual on the mechanics of operating a 16mm classroom film library. as well as in words. The book itself is a "visual." Practically every function of the film library is visualized in pictures, samples, diagrams, charts, miniatures, and the like. Distribution is being made through Encyclopaedia Britannica Films, Inc., 20 N. Wacker Drive, Chicago 6, Illinois. Price of the manual, 50c. Please mention SCHOOL SHOP.

The Mason Shortage, 16-page pamphlet, is a compendium of facts, charts, and figures showing that in the postwar era "vocational training must be established for all trades but most definitely for the training of masons." For a free copy write to the Structural Clay Products Institute, 1756 K. St. N. W., Washington 6, D. C., mentioning SCHOOL SHOP.

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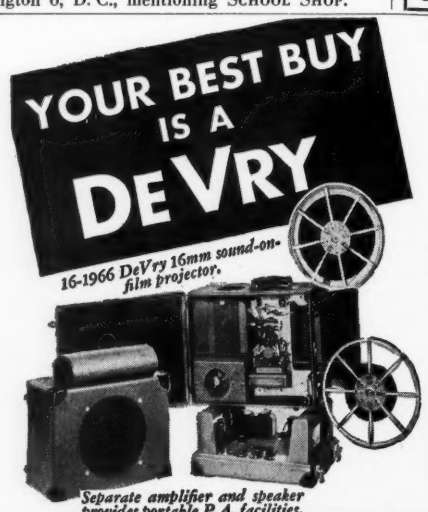
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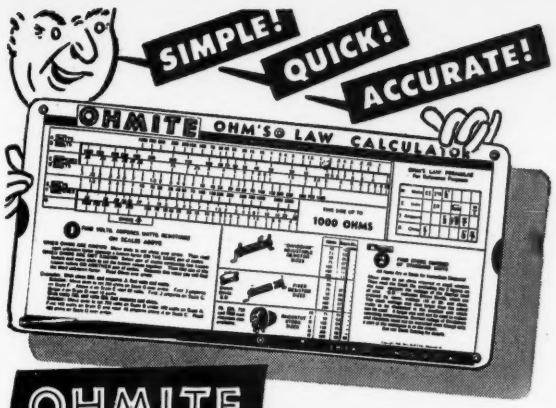

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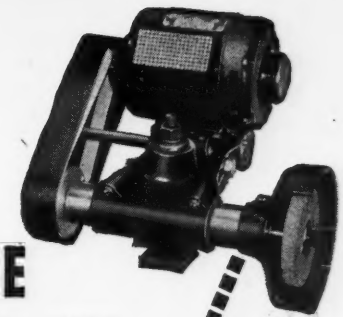

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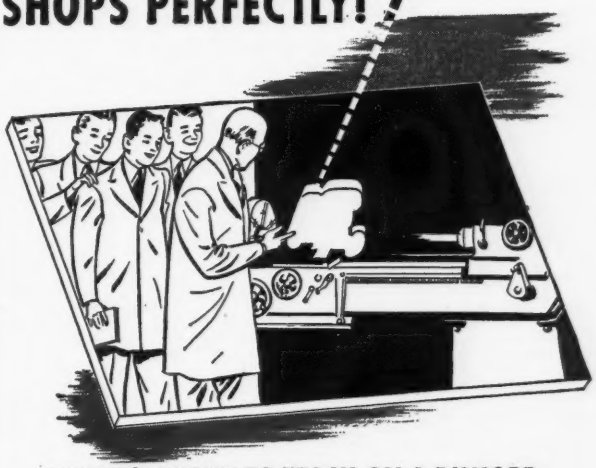

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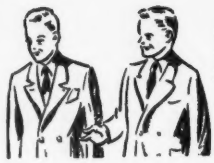

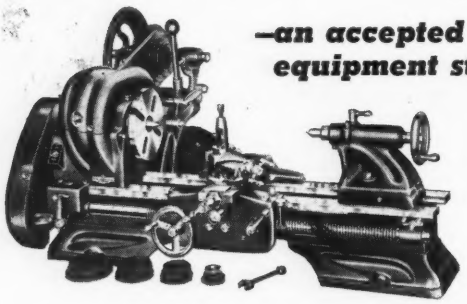

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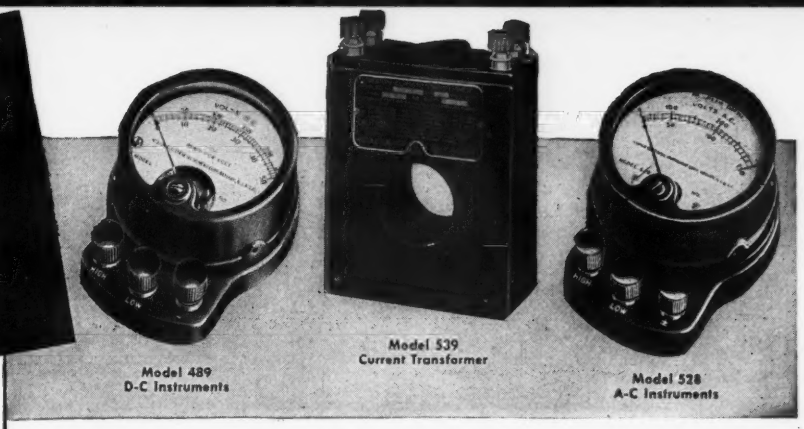

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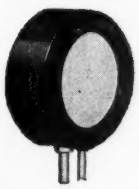

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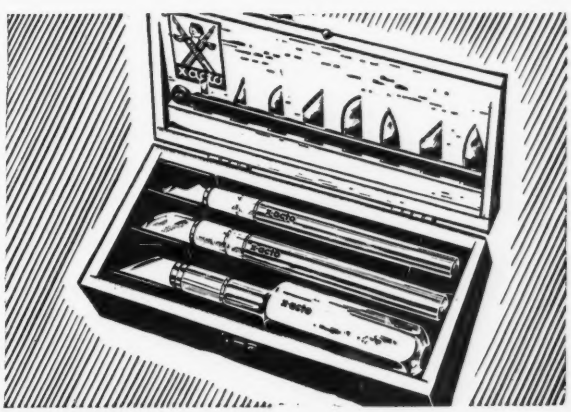

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FROM WASHINGTON

BY MICHAEL PACA

CONGRESS gives no indication of turning its attention to measures in which education has a strong interest. Extension of vocational education, federal aid to general education, and permanent school lunches will, therefore, not be considered seriously for many weeks to come. Congressmen have their minds on large peacetime issues: a Full Employment Bill, social security revision, and Surplus Property Board changes. These actions, of course, will affect schoolmen and women, even though many of them—even in Washington—are not yet fully aware of their implications.

● A full employment bill, regardless of its final form, will undoubtedly be passed, bringing with it challenges, especially to vocational education. By the terms of that bill, still under debate, the President will submit a National Production and Employment Budget. This budget will contain estimates of the number of people who will need work in any one year. On the other side of the ledger will be an estimate of the total national expenses necessary to keep these people in jobs. If all employable people will not be kept employed by the total expenditures, the government must take action.

That action may take the form of national "pump-priming" or federal spending. But other means will be wide open. The National Production Budget may show that unemployment is likely to arise from a potential lack of skilled workers needed in electronics, plastics, retail trade, or any other industry. In that case, the federal government may recommend and institute vast training programs for such jobs.

For educators the fact to remember is that the federal government intends to keep its finger not only on the number of jobless but the reasons for unemployment. Whenever lack of skills needed on the labor market is among the reasons, the switch will be thrown on new vocational training machinery.

Already, there are indications that the vocational schools may be asked by the federal government to train masons on a large scale. The shortage of 63,000 masons is said to threaten delay in postwar construction and the government is looking to the construction industry to create thousands on thousands of jobs.

In short, the days of laissez faire in vocational training, as well as in business, are nearing their end as the price for full employment.

● The education profession, or some of its mouthpieces, has insisted on being kept out of the national social-security system. Last month this system, composed of old-age and survivors' insurance and unemployment compensation, observed its tenth anniversary.

Other groups hitherto exempt (the selfemployed and farmers, for example) are now knocking at the door of social security. Congress will probably cover them under the terms of the Wagner-Murray-Dingell Bill, now being considered. This bill was also supposed to have included teachers and other public employees. But at this point the pressures of pension and annuity associations began to have their effect on Congress. Consequently, the Wagner-Murray-Dingell Bill was redrafted, exempting schoolmen and women from social-security protection. The bill does provide for "voluntary compacts" between school systems and the Social Security Board. The effect of such "compacts" on the welfare and security of teachers will probably be close to nil.

● Overhauling of the Surplus Property Board, on which Congress is now busy, should result in breaking all bottlenecks which have kept war surplus property from flowing into the schools.

The best informed observers describe the surplus property picture (at this writing) as "confused." Although there are no less than five different methods—legal and extra-legal—by which schools can get surpluses, the amount disposed of to the schools has been negligible.

Hope for action lies in the organization of a strong Surplus Property Division which the U. S. Commissioner of Education Studebaker is proposing for his office. But there is opposition to such a move from various officials in the Surplus Property Board and the Reconstruction Finance Corporation, one of the disposing agencies.

Nevertheless, Commissioner Studebaker is going ahead with his plans. He has asked Henry F. Alves, one of his top-notch men, to head up this service and make it as go-getting a unit as possible.

● "Reorganization" is the order of the day in the U. S. Office of Education, but the vocational division is not being touched by all the goings-on. Commissioner of Education Studebaker is concentrating on strengthening his elementary, secondary, and other divisions. To date, however, no new appointments have been made.

Incidentally, the Assistant Commissioner for Vocational Education (J. C. Wright) is retaining his title in this overhauling. The plan to change that title to Director for Vocational Education has been abandoned.

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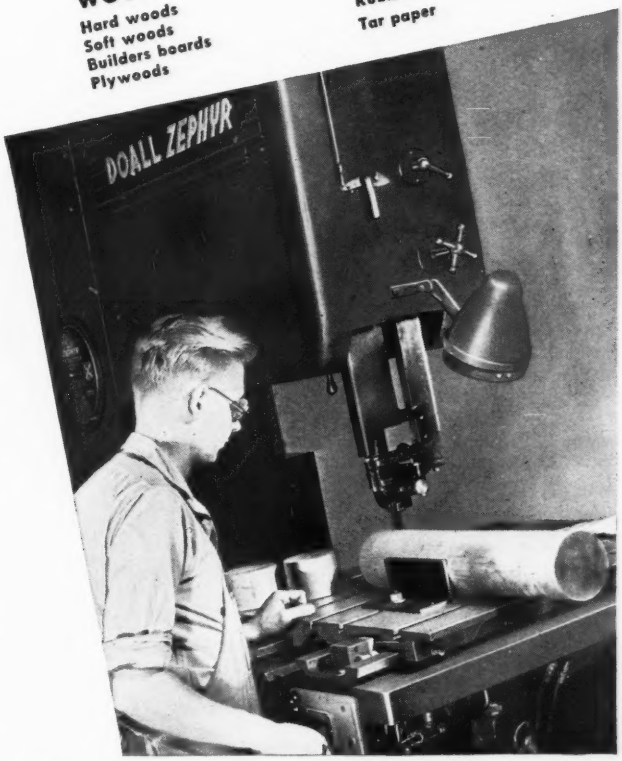

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